

INTERPRETING BAT CALLS

TIMPANOGOS CAVE NATIONAL MONUMENT

Final Report

Abstract

Bats can be identified and studied by analyzing their unique calls. This project purchased 2 high-frequency Anabat recording systems, to identify and research bats in flight and educate the visiting public about the value of bats through evening programs.

The first year of the “Interpreting Bat Calls” Project is completed. In 2 evening programs at the monument’s Visitors Center, 55 bat calls were recorded. Only one bat call was recorded at the cave entrances. All of the calls were analyzed and 6 species of bats were identified: Little Brown Bat (*Myotis lucifugus*), Western Long-eared Bat (*Myotis evotis*), Big Brown Bat (*Eptesicus fuscus*), Hoary Bat (*Lasiurus cinereus*), Western Small-footed Bat (*Myotis ciliolabrum*), and Townsend’s Big Eared Bat (*Corynorhinus townsendii*).

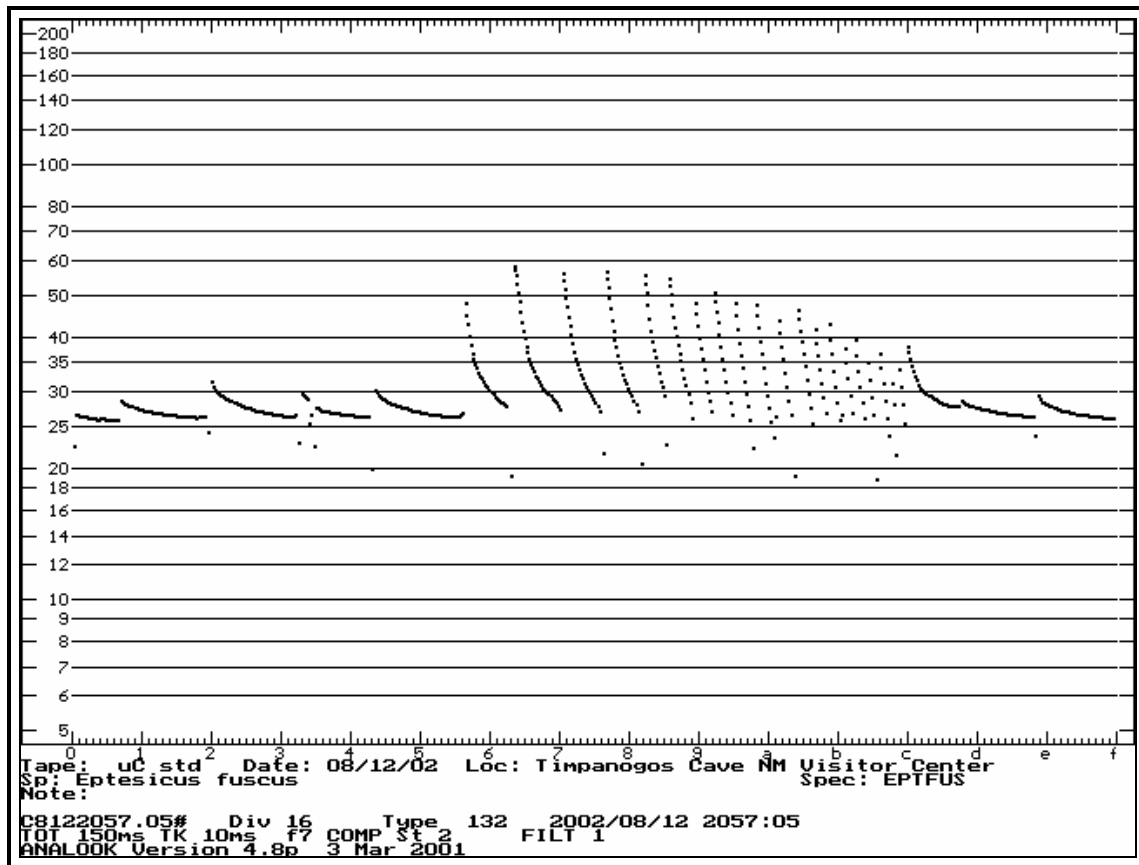
Justification

Bats may be the most misunderstood animals in the United States. Of the 45 bat species in the United States, 6 species are listed as endangered and 20 species are listed as Species of Concern (Harvey *et al* 1999). Due to the lack of understanding and proper management, bat populations are showing significant declines throughout the United States.

Bats are crucial to our ecosystem. They are an important control for insect populations. Bats eat more than half their body weight in insects each night. Bats also are important for pollination and seed dispersal. Many plant species depend almost entirely on bats for pollination. Bats are important for dispersing seeds into areas that have been clear-cut. Without bats, the health of our ecosystem would be greatly compromised.

Timpanogos Cave National Monument, which is located along the Wasatch Front between the metropolitan areas of Salt Lake City and Provo, Utah, has an opportunity to gather information about the monument’s bats and educate the public. The monument receives over 130,000 visitors annually, and often over 75 people will attend interpretive evening programs. In the past, 3 bat species of special concern were thought to inhabit the monument. They are the Spotted Bat (*Euderma maculatum*), Western Small-footed Myotis (*Myotis ciliolabrum*), and Townsend’s Big Eared Bat (*Corynorhinus townsendii*). Since over half of the bat species in the United States are threatened, it is important to know what species are present at Timpanogos Cave N.M., what kind of habitat the monument is providing, and educate the public on the importance of bats.

Bats produce calls beyond the human range of hearing that are used for echolocation to navigate and hunt insects in the dark. The sound spreads as it travels and when it strikes an object, it is reflected back as an echo. By emitting this sound and listening to the echo, the bat can determine the size, shape, and path of the object of interest (Hill *et al* 1992).



Anabat recording showing a feeding buzz from a Big Brown Bat (*Eptesicus fuscus*.)

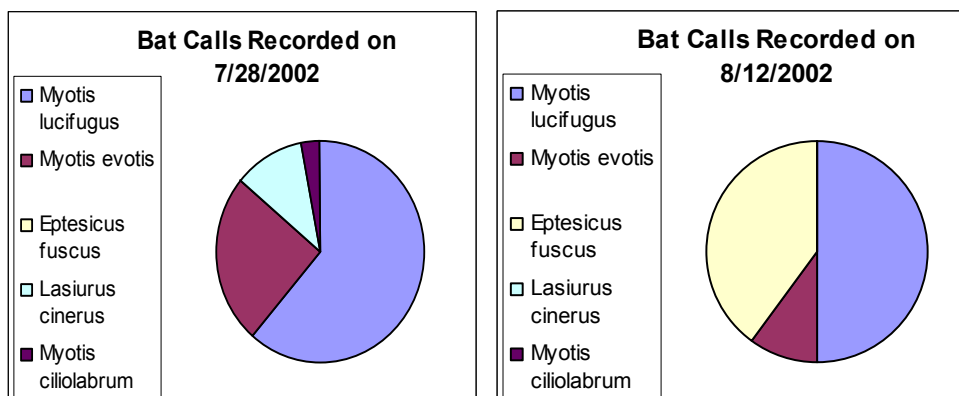
Most bat species have their own unique calls, which enable researchers to study bats using a high-frequency recording device. An Anabat detector modulates the bat's high-frequency calls into audible sound. An Anabat ZCA Interface Module converts these frequencies into digital data that is graphically recorded and analyzed on a computer. These graphical recordings of the calls are used to identify bat species. Through the use of the Anabat detectors we will be able to determine the presence or absence of bat species, to estimate population distributions, and to provide a hands-on learning experience for educating the public about the importance of bats.

Results

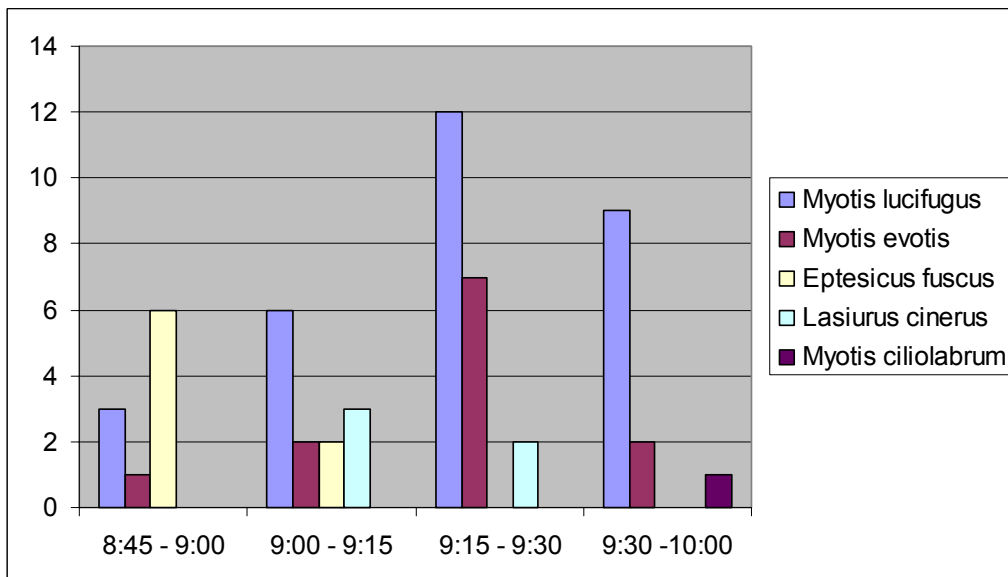
The first year of the "Interpreting Bat Calls" Project is completed. With the funding provide by Western Parks and Monument Association (WPMA), 2 Anabat detector systems were purchased, and Jon Jasper and Cami Pulham were sent to be trained at the

Bat Conservation and Management workshop sponsored by Bat Conservation International. Having the equipment and training, the staff have been presenting educational presentations and performing research on bat use.

In 2 evening programs at the monument's Visitors Center, 55 bat calls were recorded. The bat calls were analyzed and 5 species of bats were identified. The recorded calls were identified as 57% Little Brown Bat (*Myotis lucifugus*), 20% Western Long-eared Bat (*Myotis evotis*), 14% Big Brown Bat (*Eptesicus fuscus*), 7% Hoary Bat (*Lasiurus cinereus*), and 2% Western Small-footed Bat (*Myotis ciliolabrum*). NPS Inventory and Monitoring crews, misted netting over 2 nights by the Visitors Center and only captured 2 bats, a Little Brown Bat (*Myotis lucifugus*) and Western Long-eared Bat (*Myotis evotis*). These captures confirm that the calls for these 2 bat species were identified corrected.



The species diversity from the two evening programs



The number of bats recorded during different time intervals

Using the Anabat detectors, the entrances to Timpanogos Cave were surveyed. The entrance to Timpanogos Cave was monitored for 4 days in June for nursing bats. No

calls were recorded. Unexpectedly, a short call of Townsend Big-eared Bat (*Corynorhinus townsendii*) was recorded in the entrance to Hansen Cave on November 6. A few days after, a Townsend Big-eared Bat was identified while roosting in the entrance of Hansen Cave. As the new gates are added to the entrances, they will be monitored for bat use.

Interpretive presentation covering the misconceptions of bats, bat biology, management of bat habitat, and bat research techniques was given. Presentations were attended by up to 40 people, adults and children. The presentation also gave visitors the opportunity for hands-on use of the Anabat equipment.



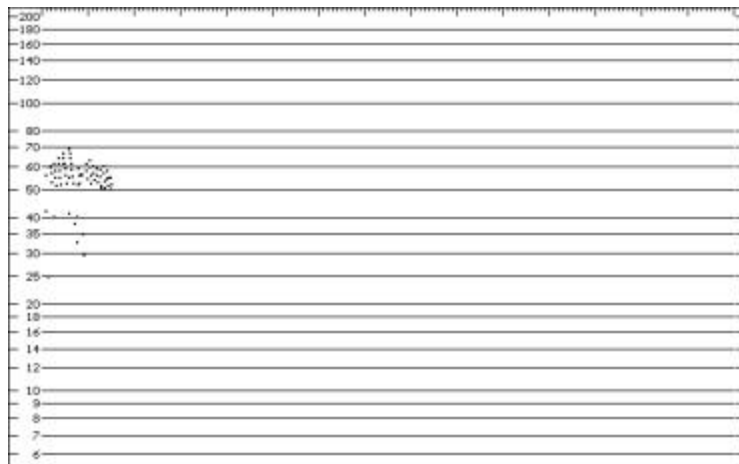
Cami Pulham teaching Anabat survey techniques



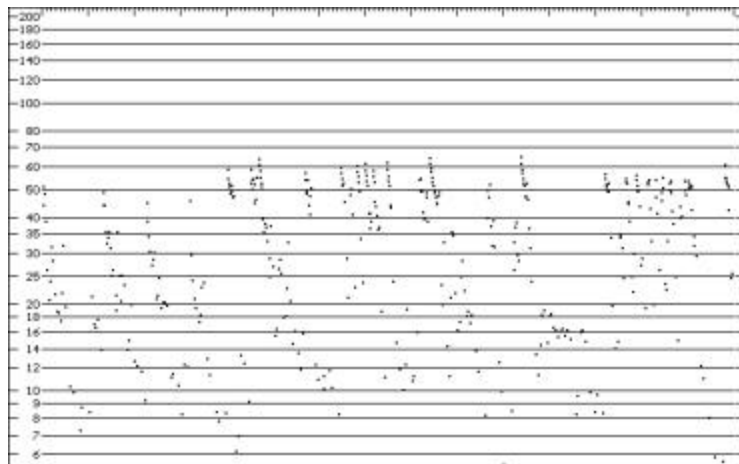
Catching bats in a Harp trap

Conclusion

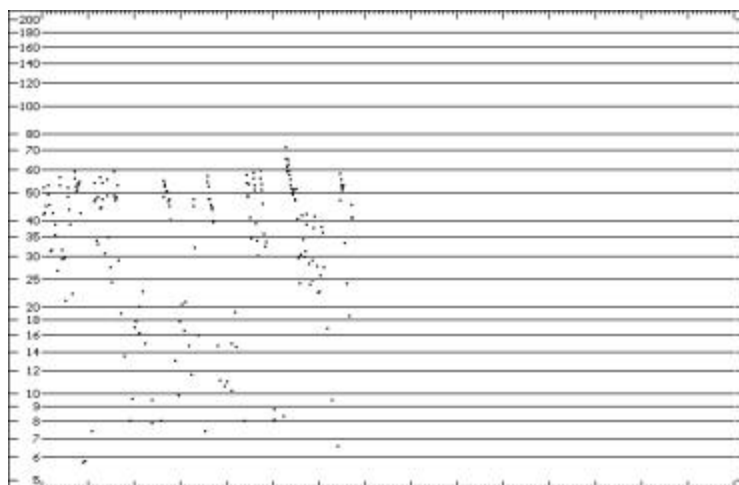
A foundation has been established for a long-term bat monitoring program. The necessary equipment and training have been achieved and started to be put to work thanks with the support of the Western Parks and Monument Association (WPMA). There are 19 possible bat species known to exist in the areas surrounding Timpanogos Cave NM. Additional areas will be surveyed in search of additional species. The changes to cave, such as the installation of new gates or doors, will be monitored. Our expertise and services will be available to help manage bat populations on BLM or Forest Service Lands. Hopefully, our successes will promote growth in bat populations and better public knowledge of the importance of bats.



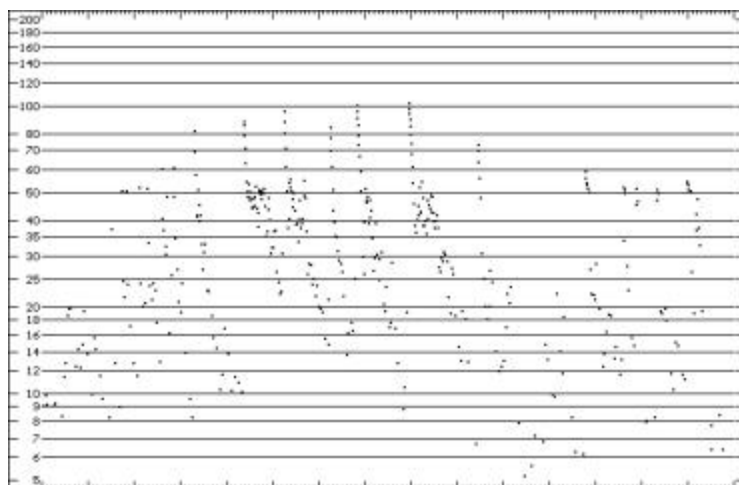
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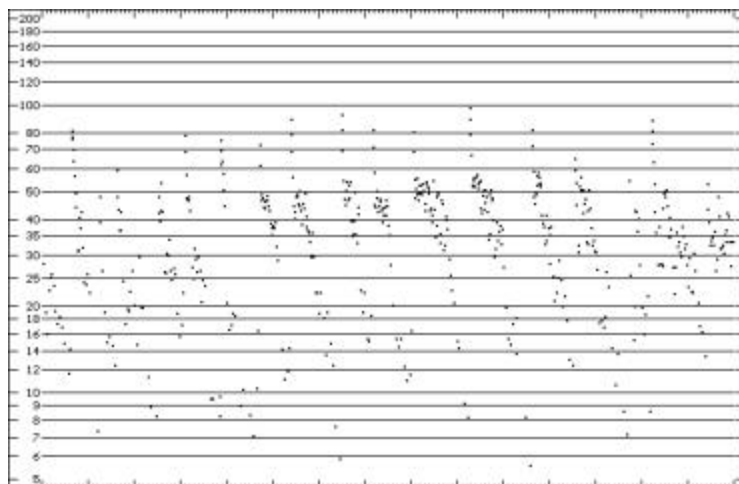
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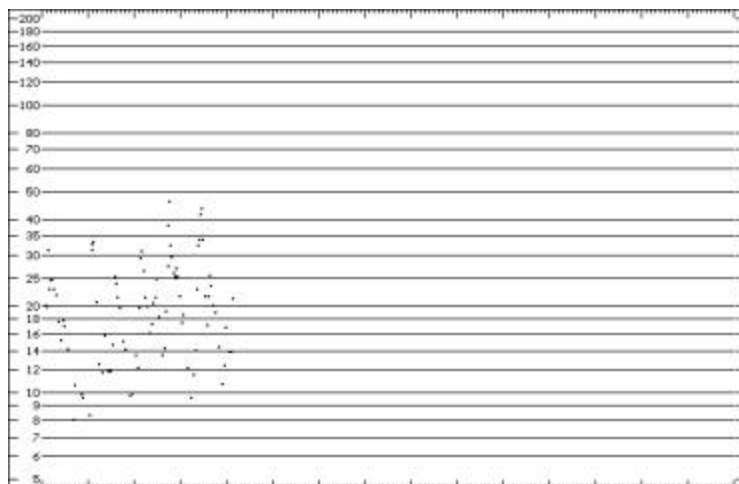
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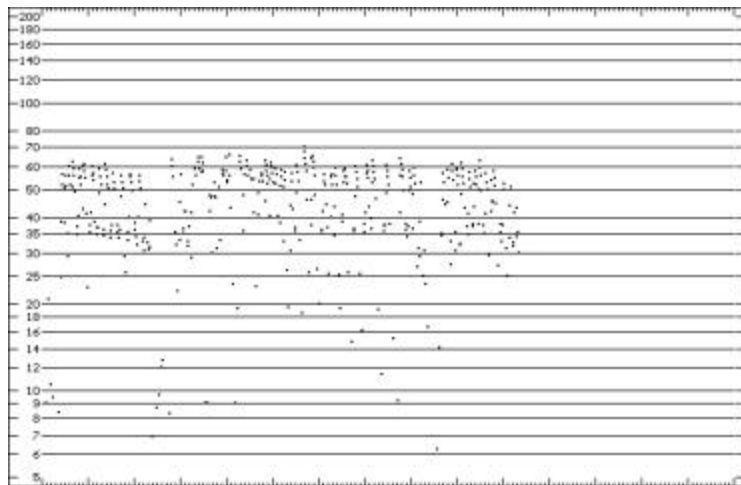
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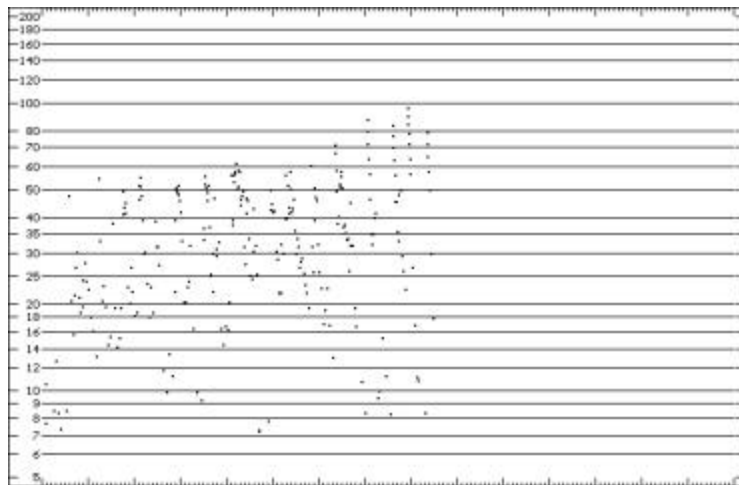
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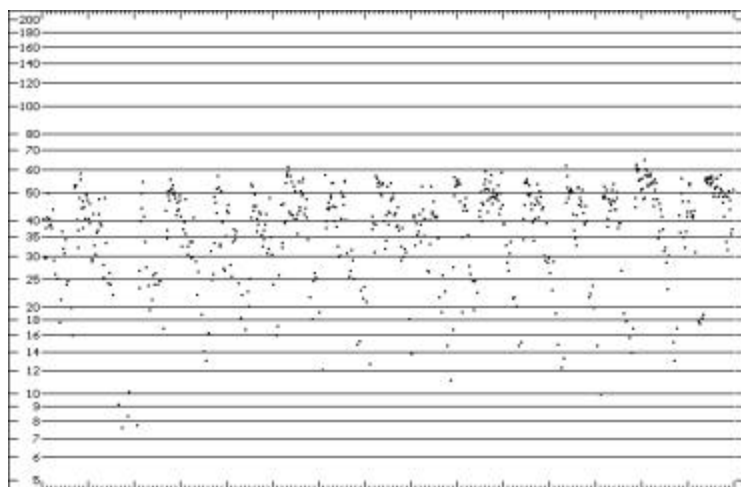
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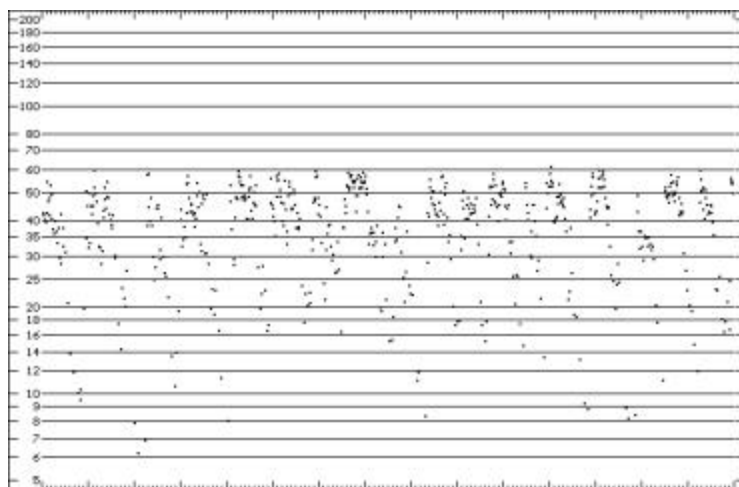
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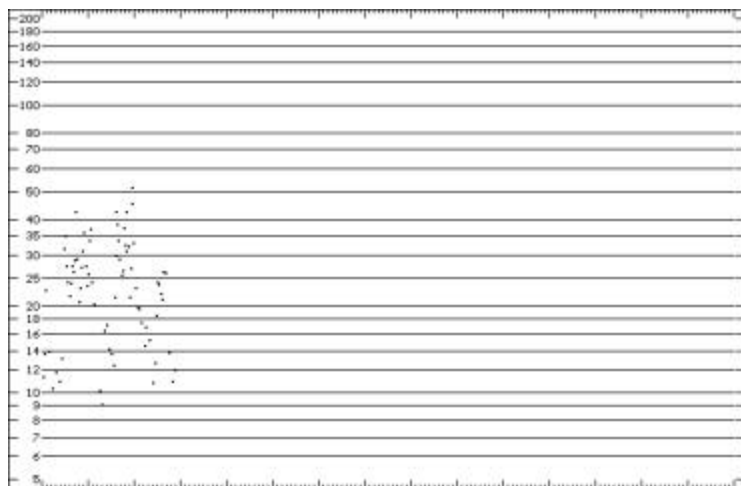
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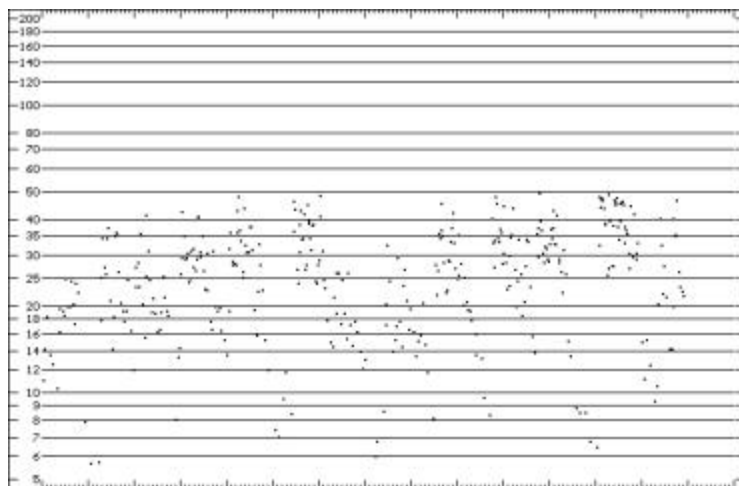
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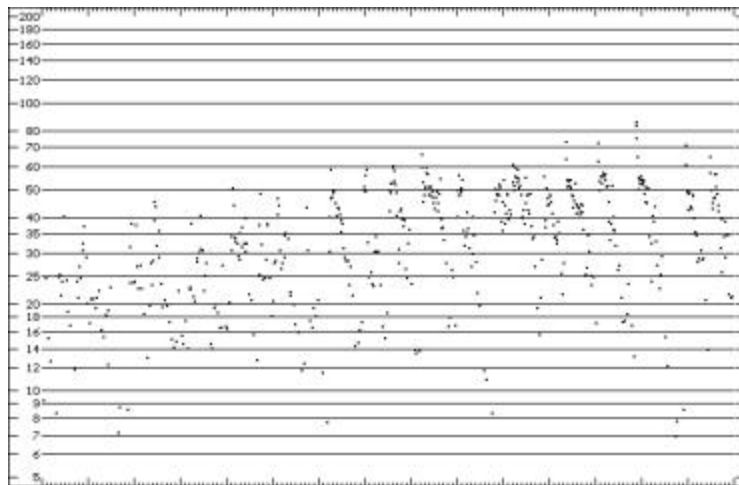
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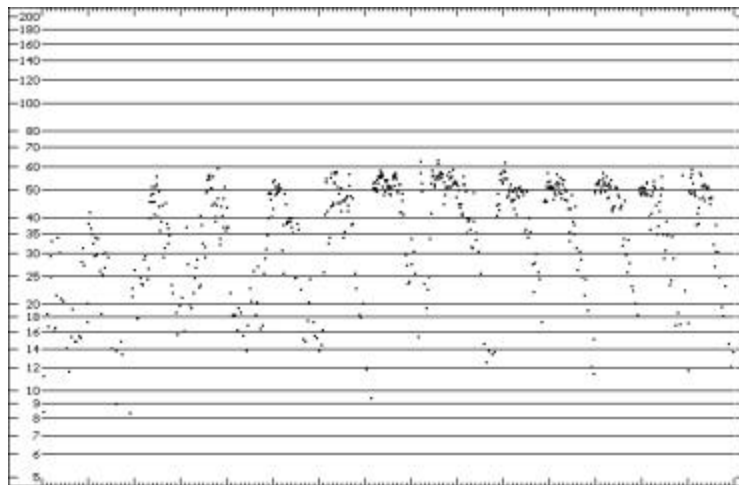
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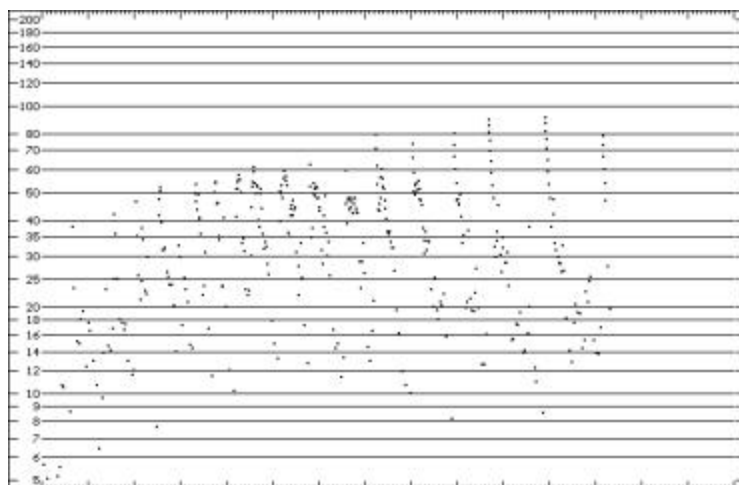
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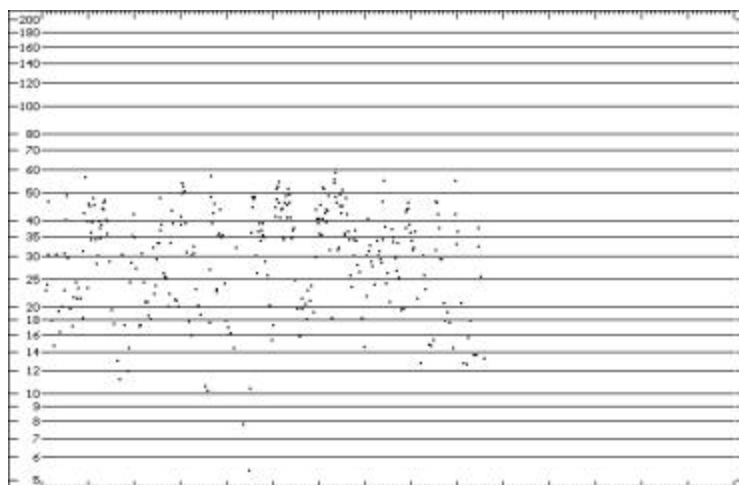
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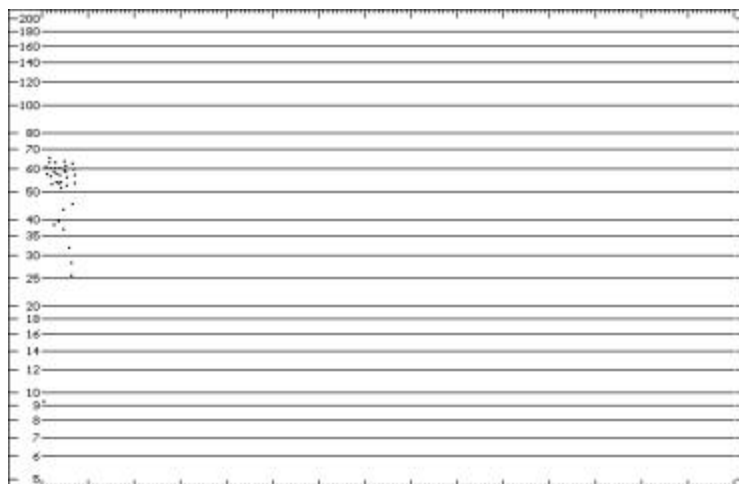
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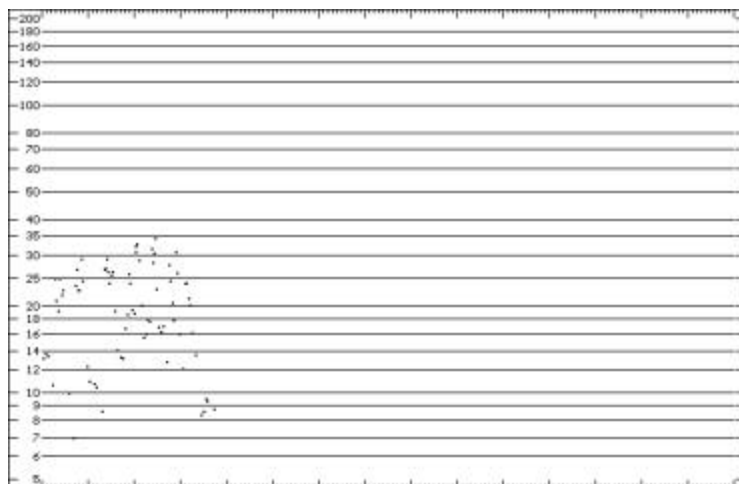
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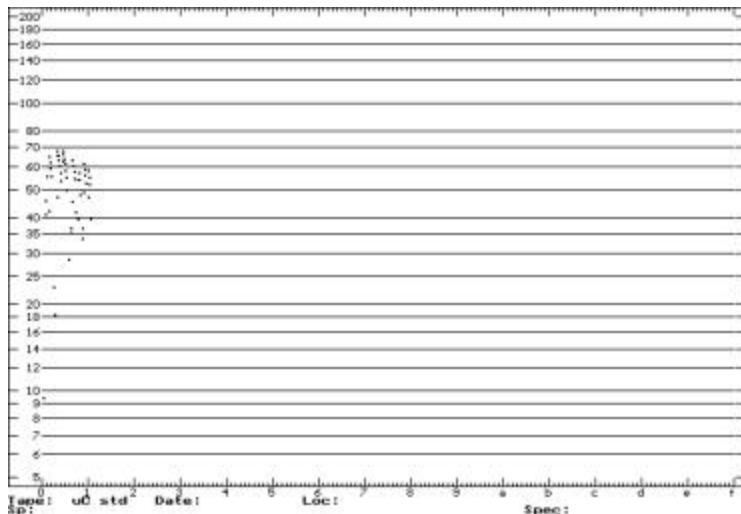
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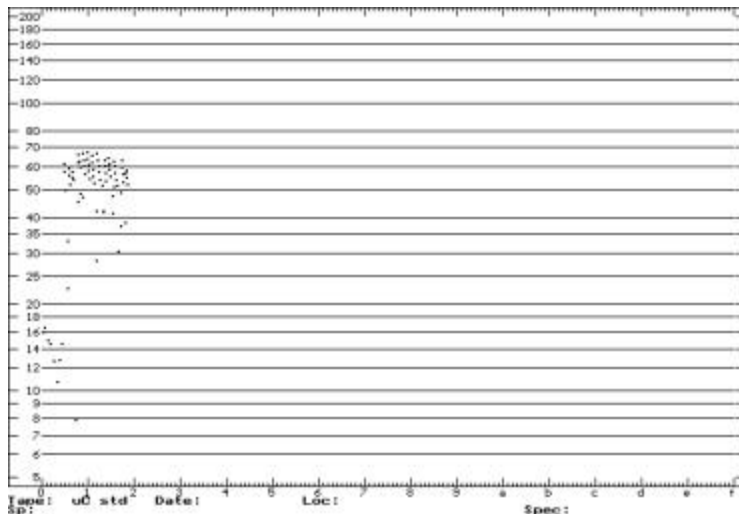
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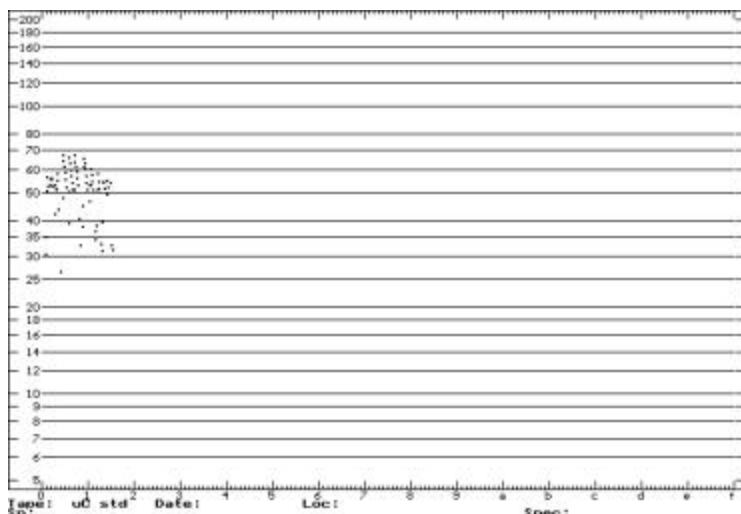
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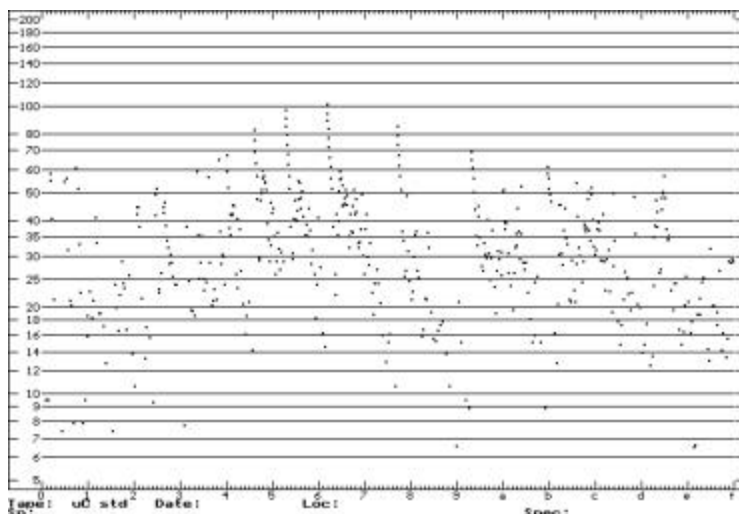
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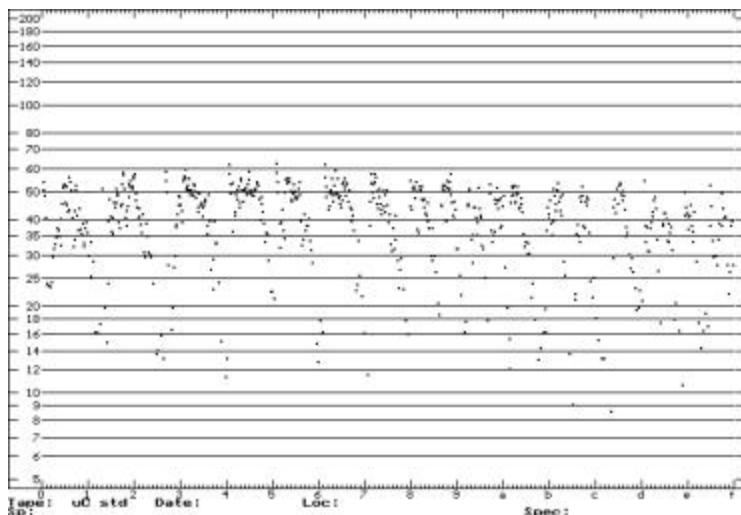
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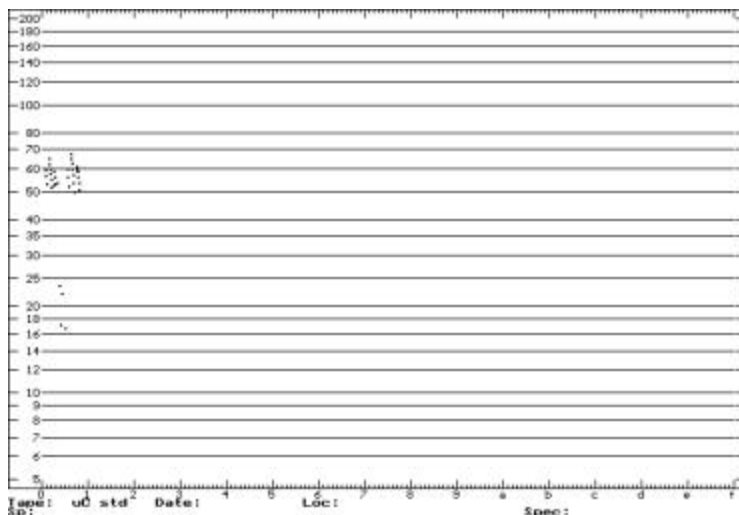
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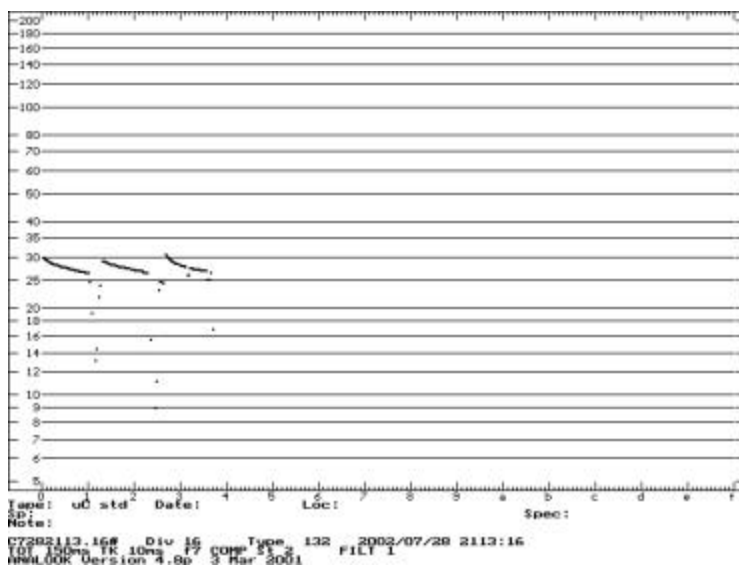
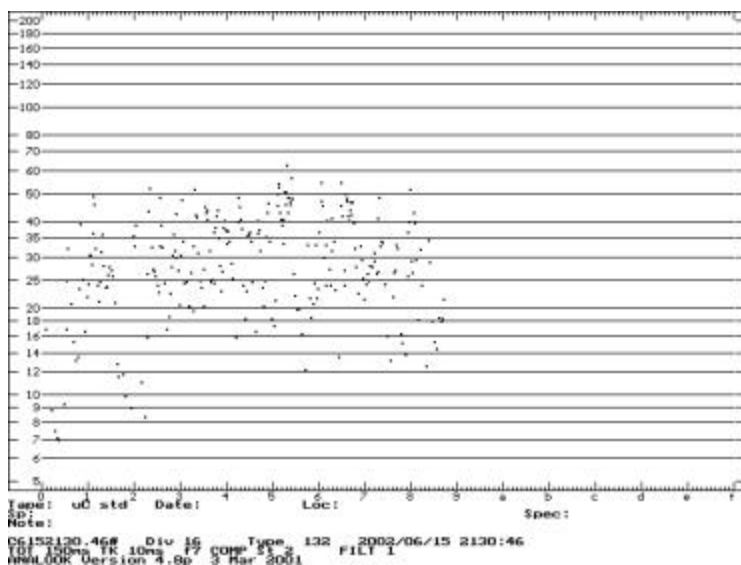
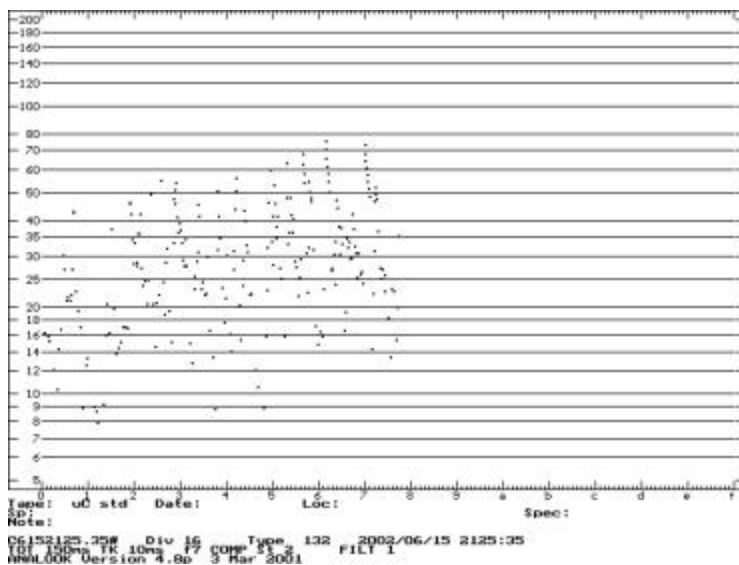
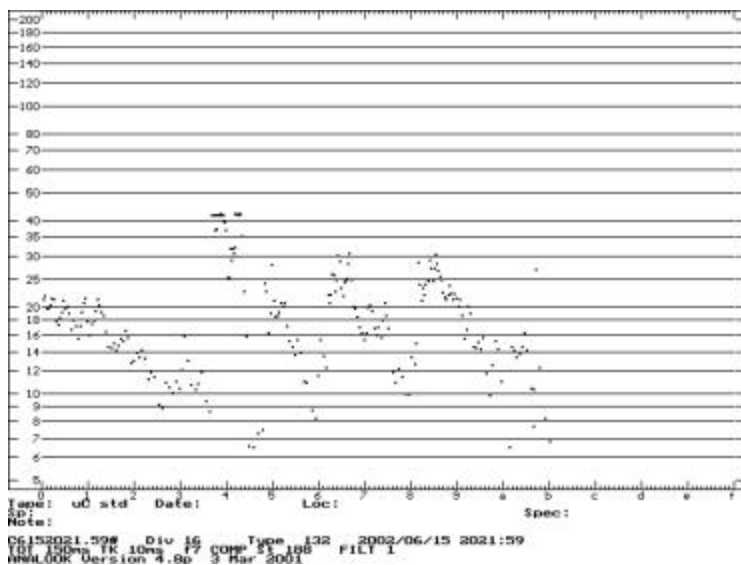
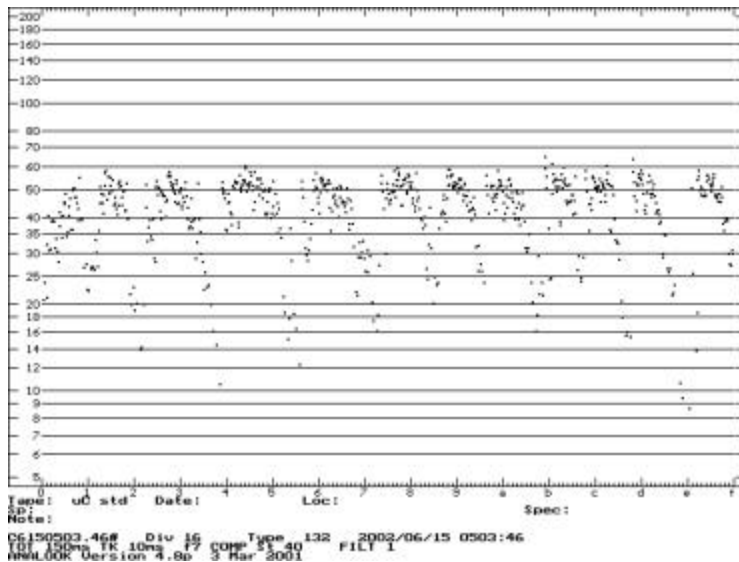
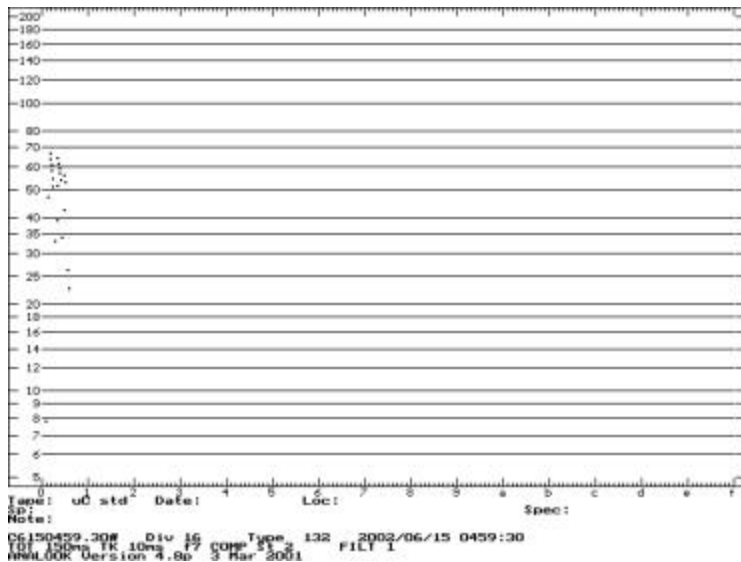
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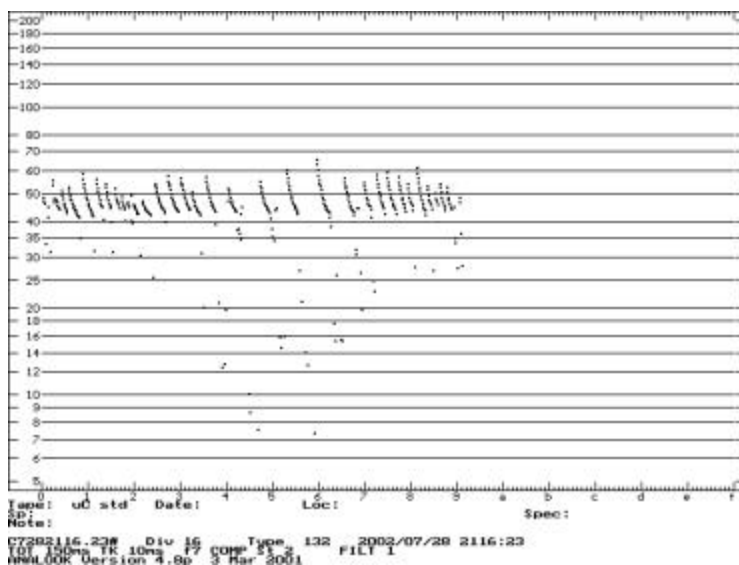
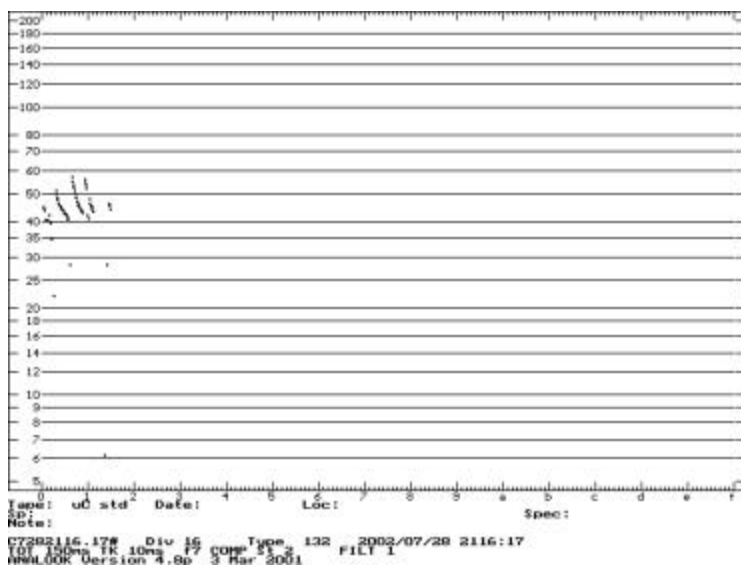
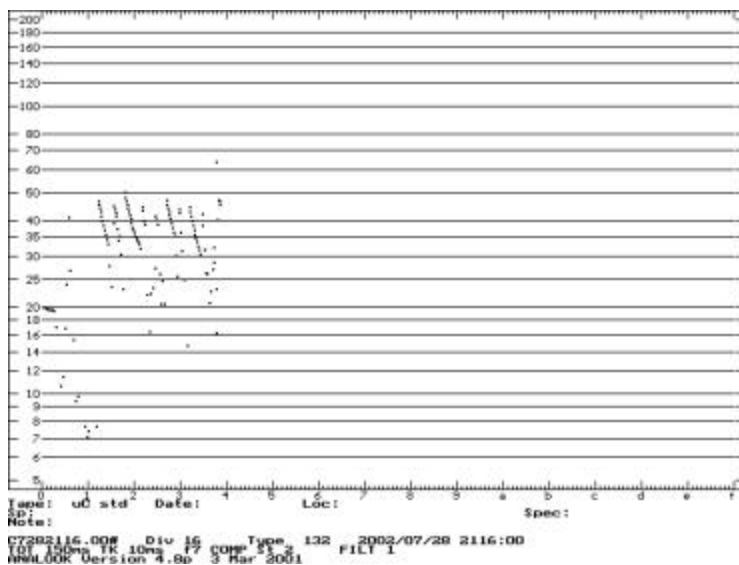
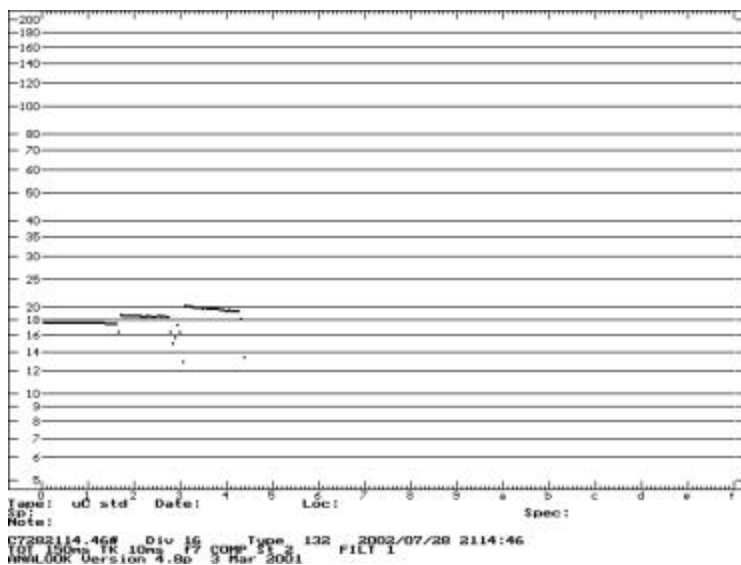
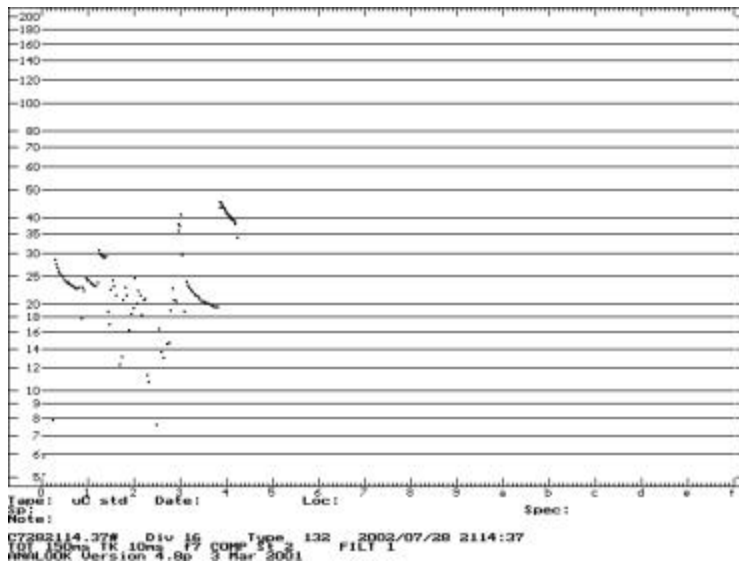
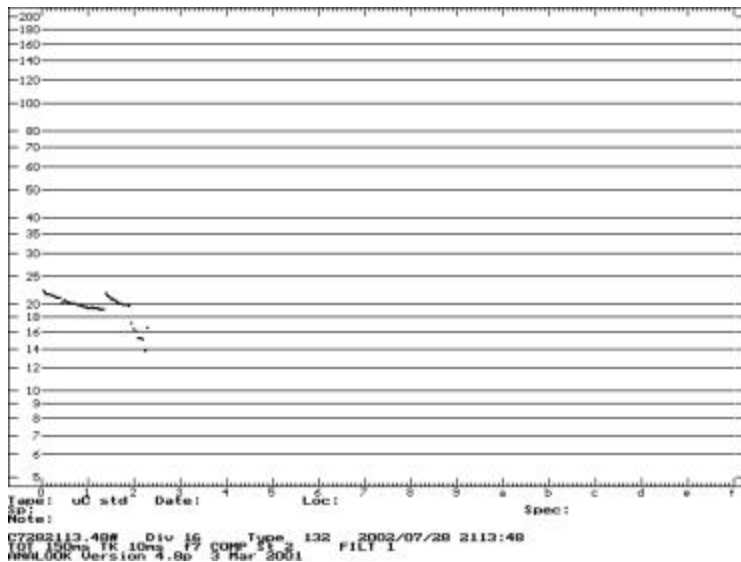


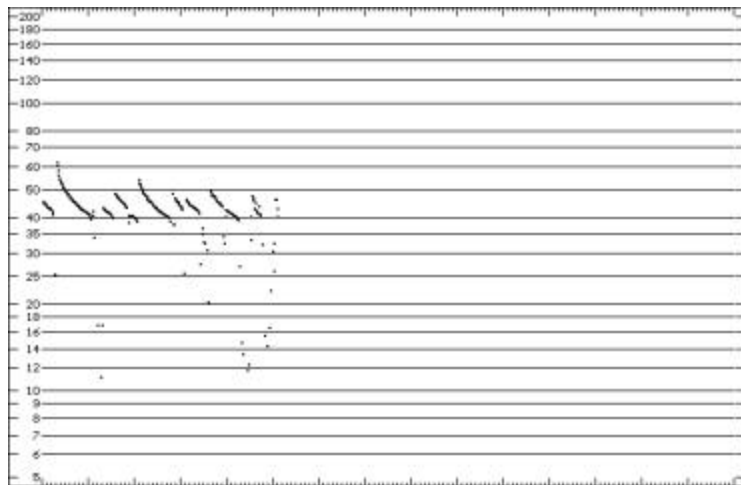
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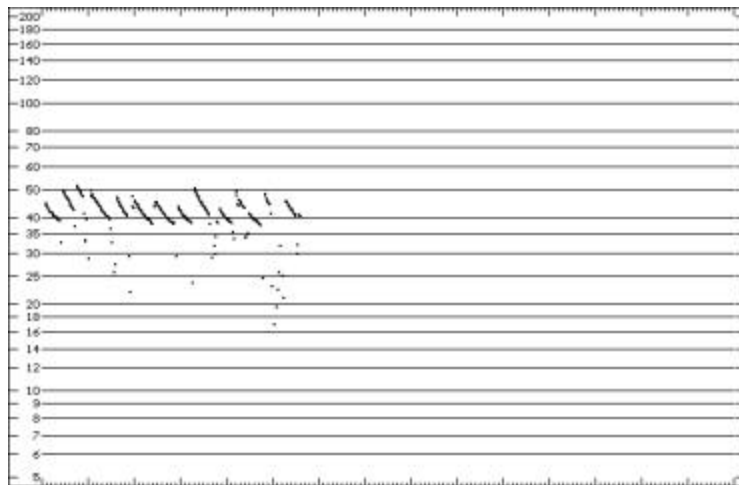
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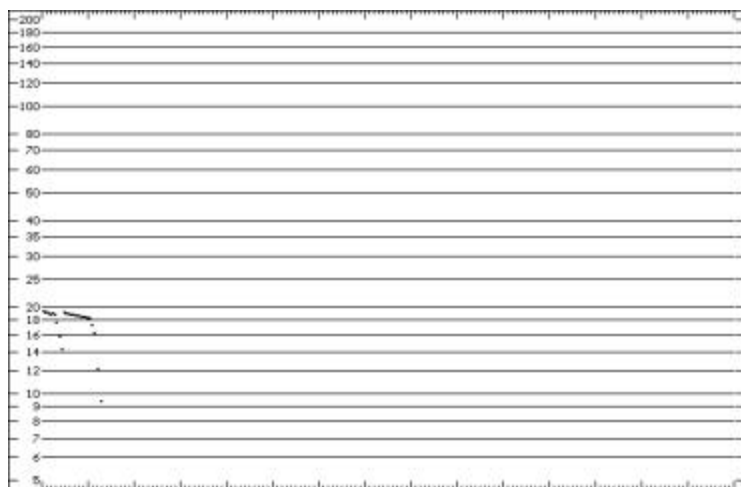




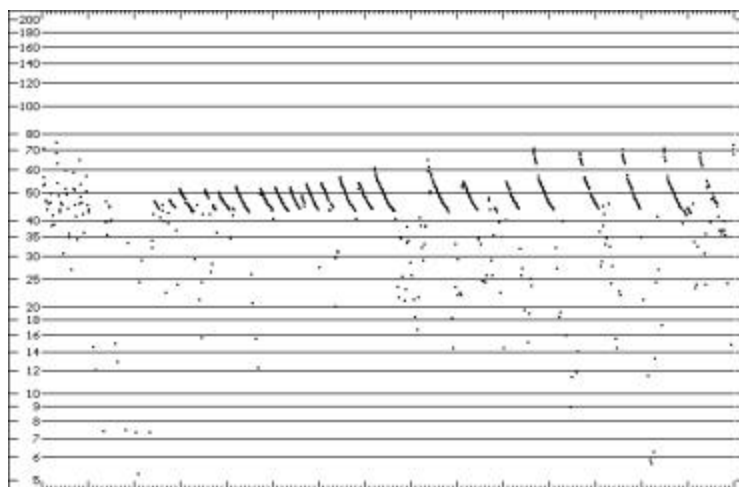
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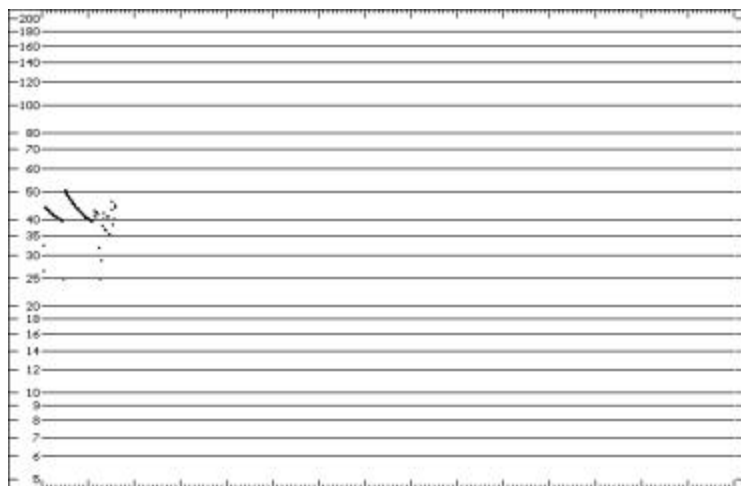
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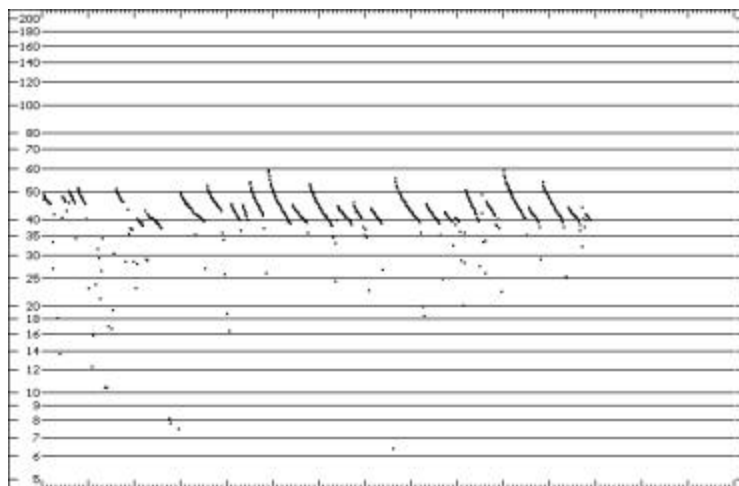
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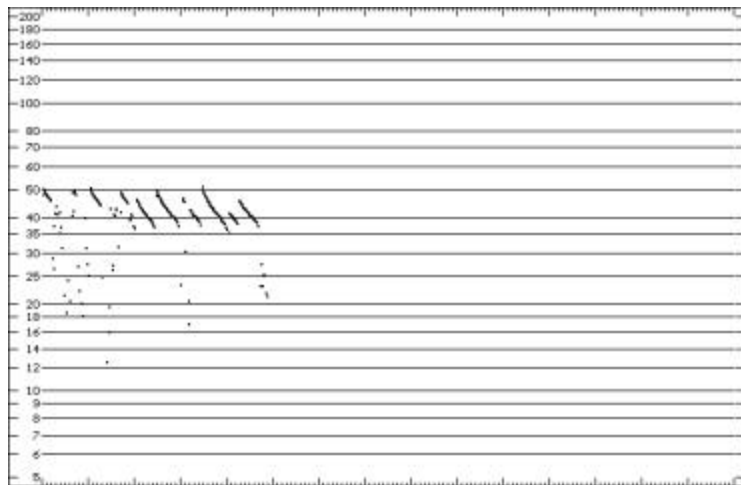
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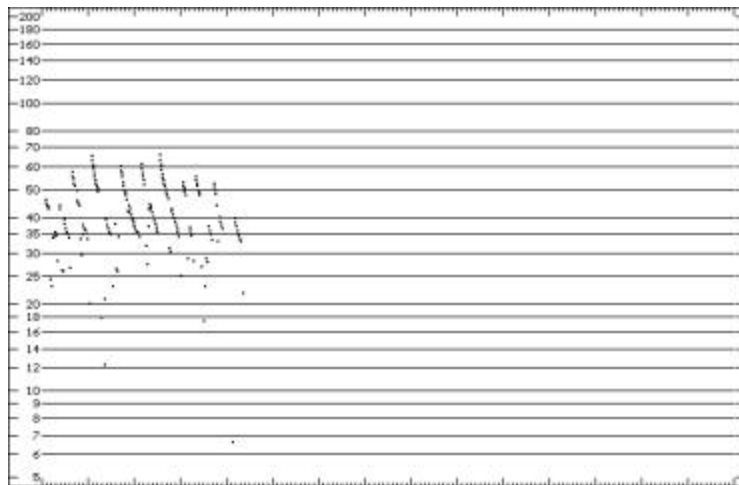
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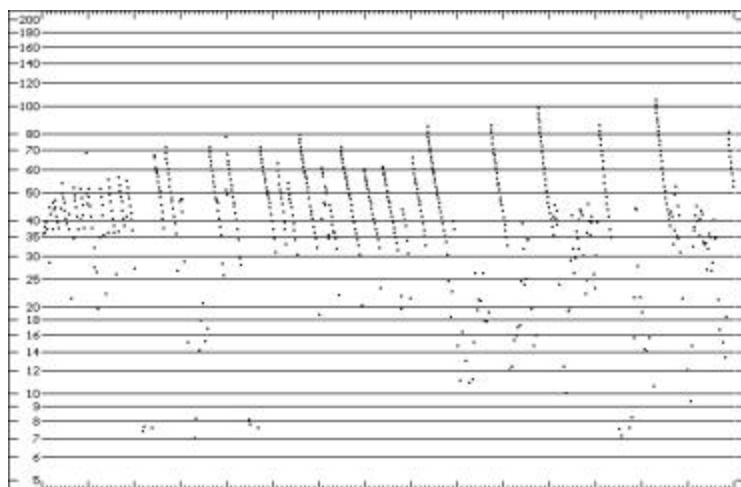
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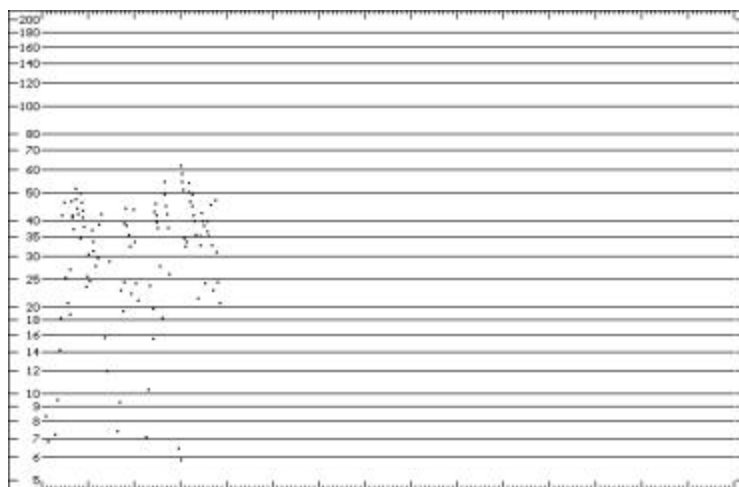
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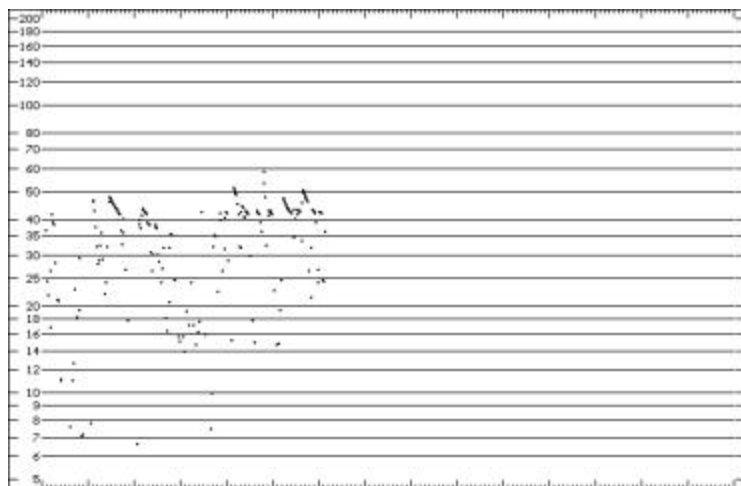
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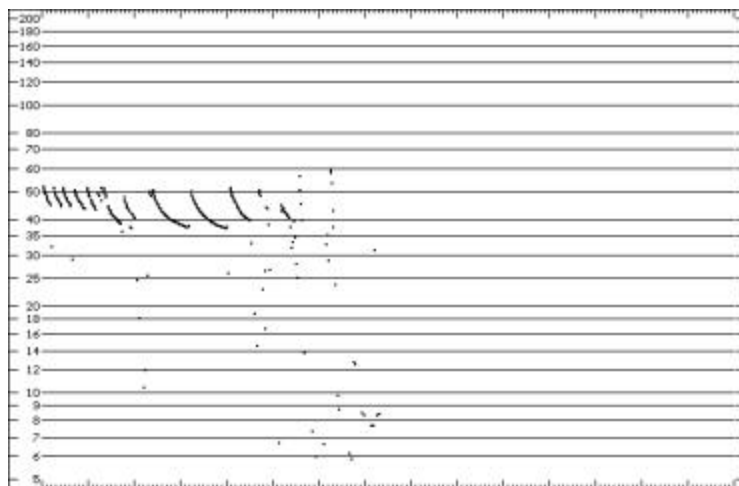
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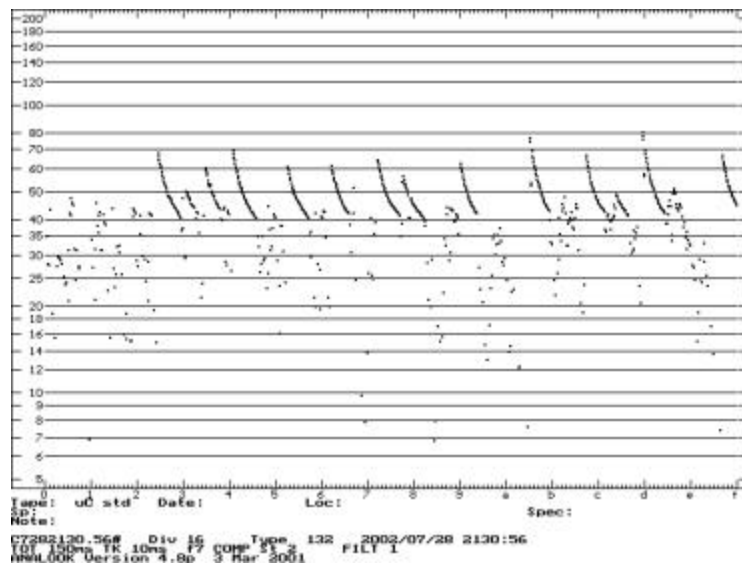
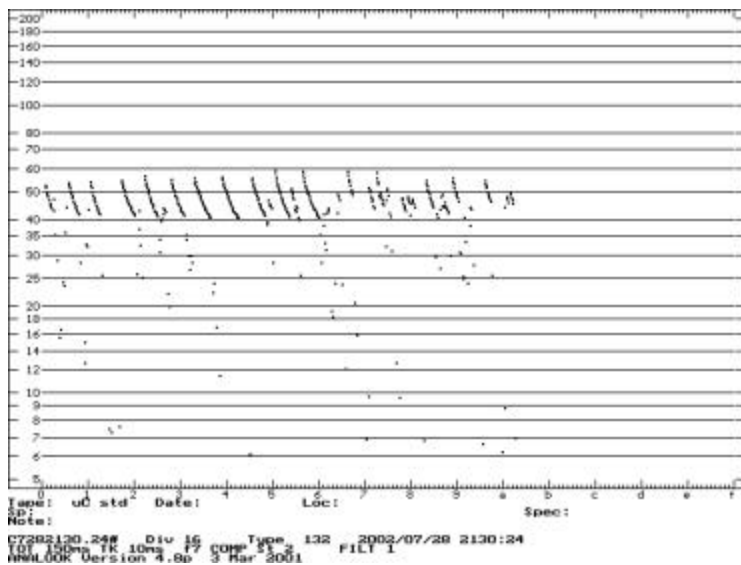
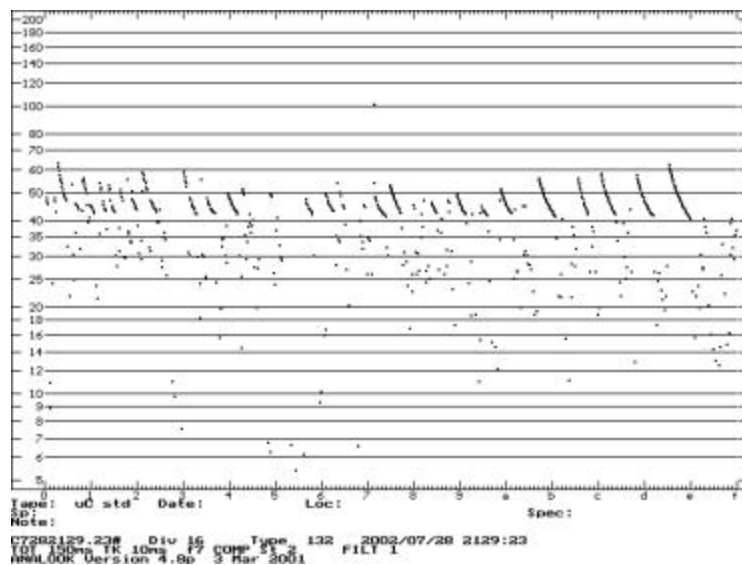
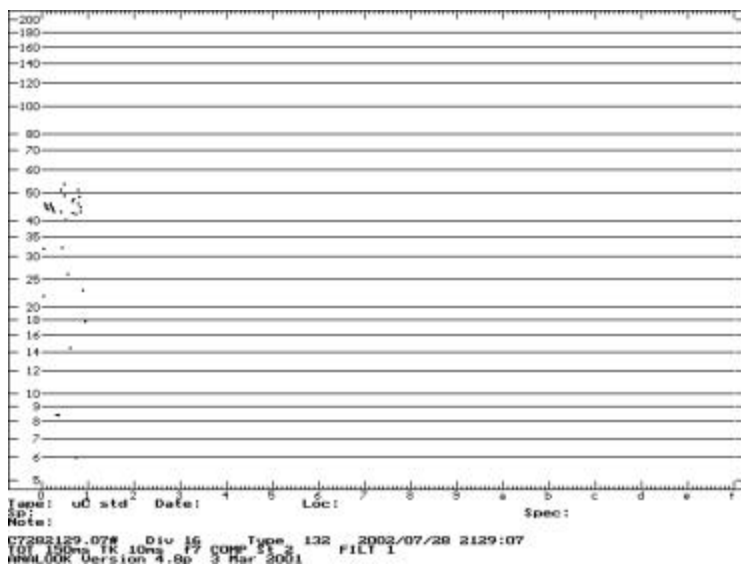
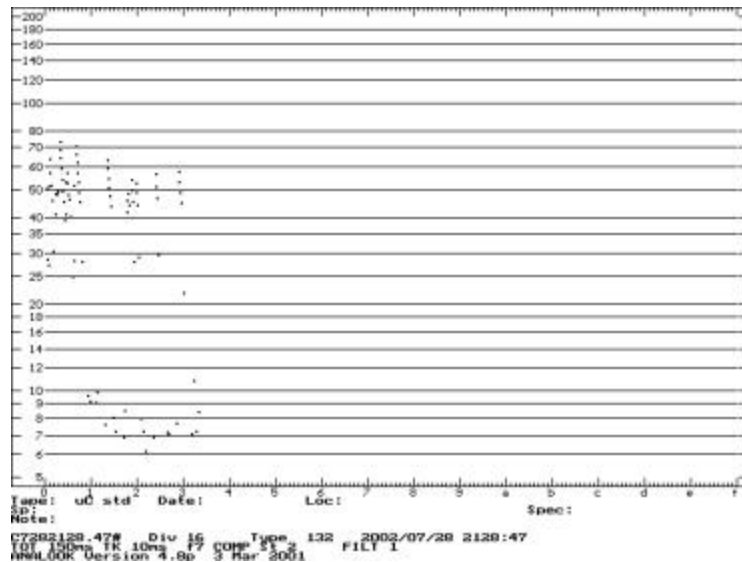
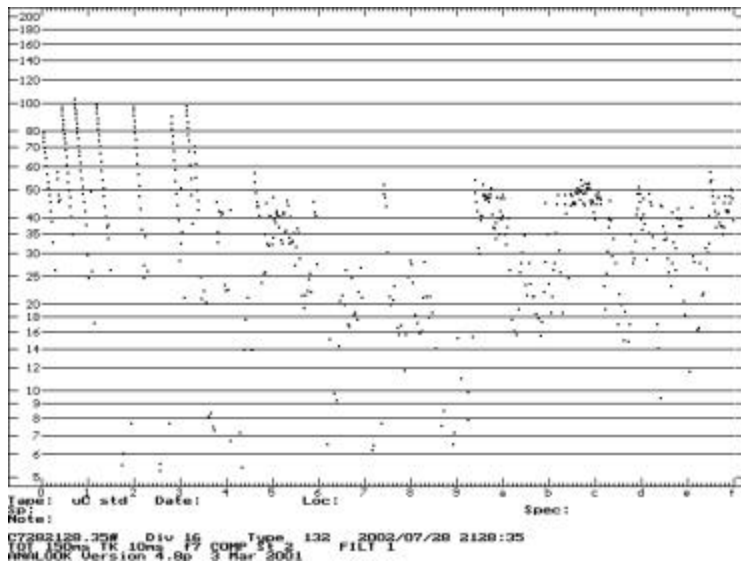
Time: u0 std Date: Loc: Spec:
 SP:
 Note:
 C7282127.54# Div 16 Type 132 2002/07/28 2127:54
 T01 150ms TR 10ms F7 COMP S1 2 FILT 1
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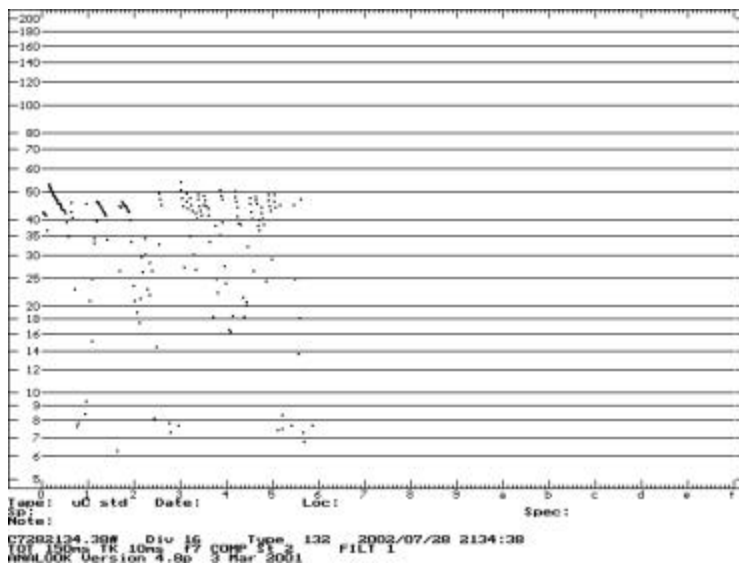
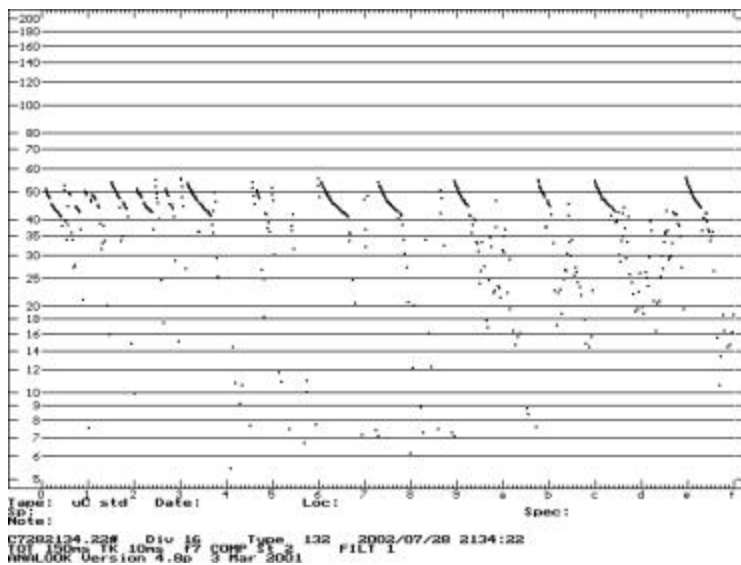
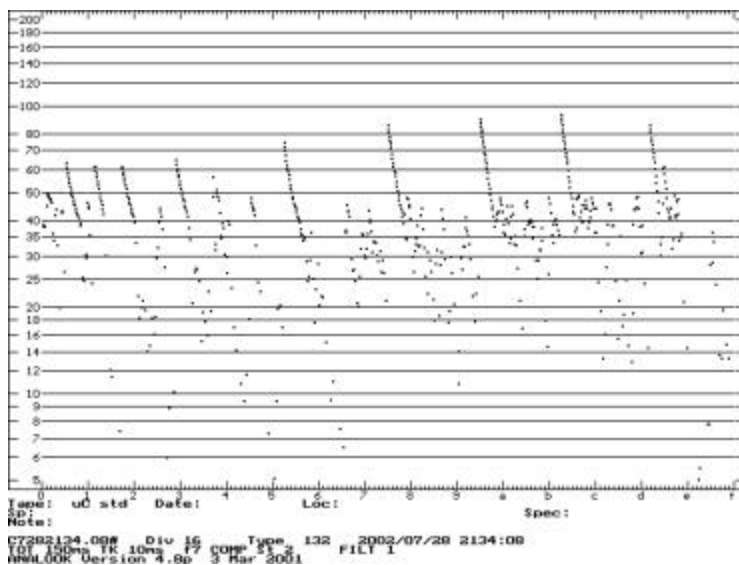
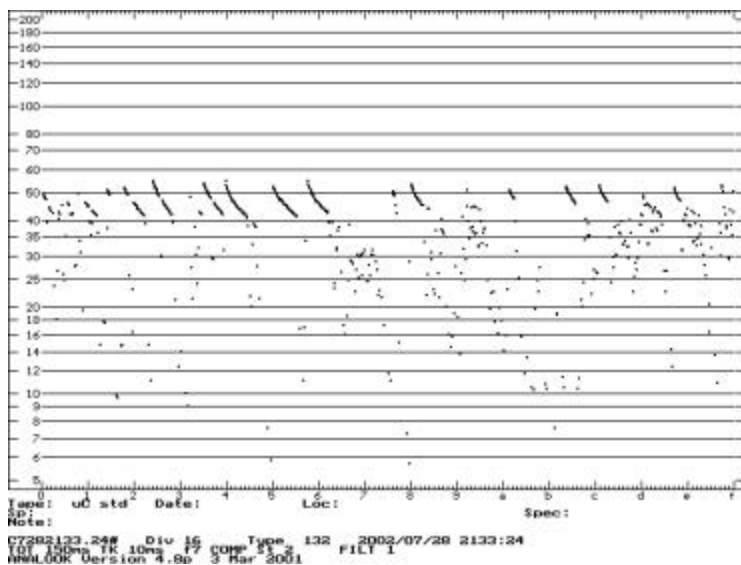
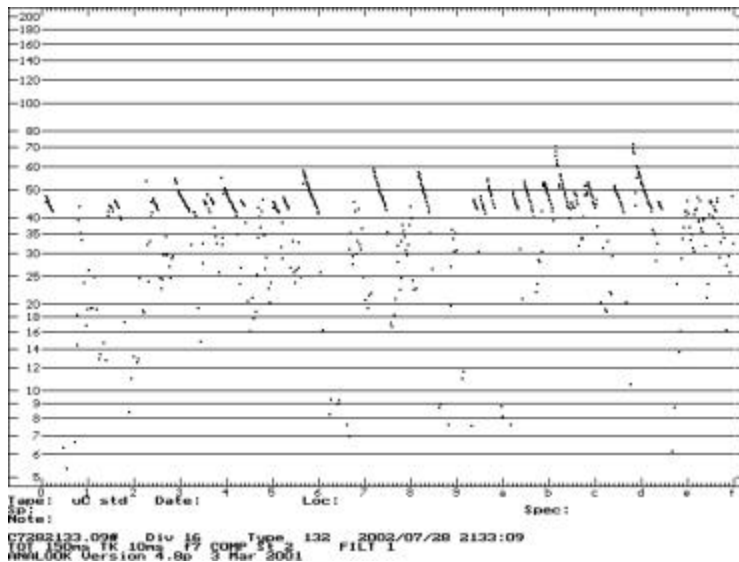
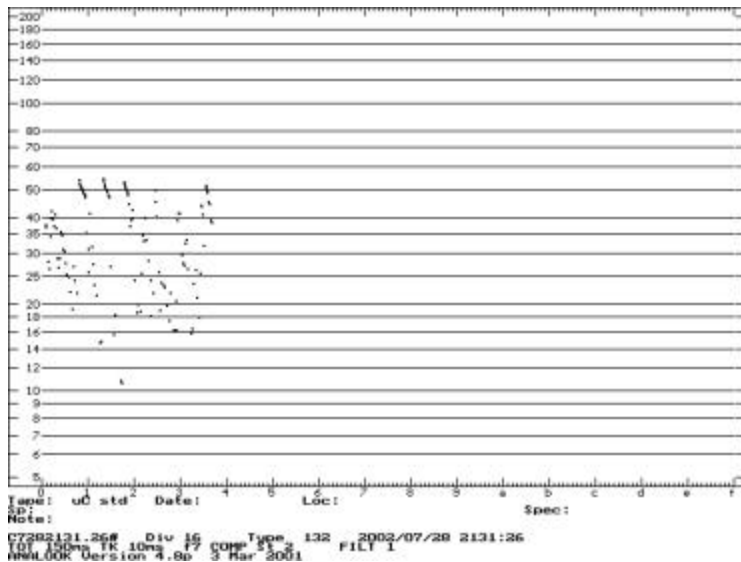


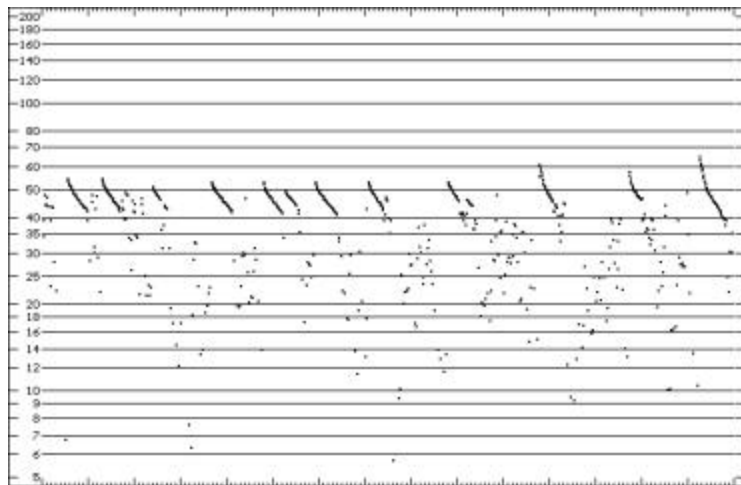
Time: u0 std Date: Loc: Spec:
 SP:
 Note:
 C7282128.07# Div 16 Type 132 2002/07/28 2128:07
 T01 150ms TR 10ms F7 COMP S1 2 FILT 1
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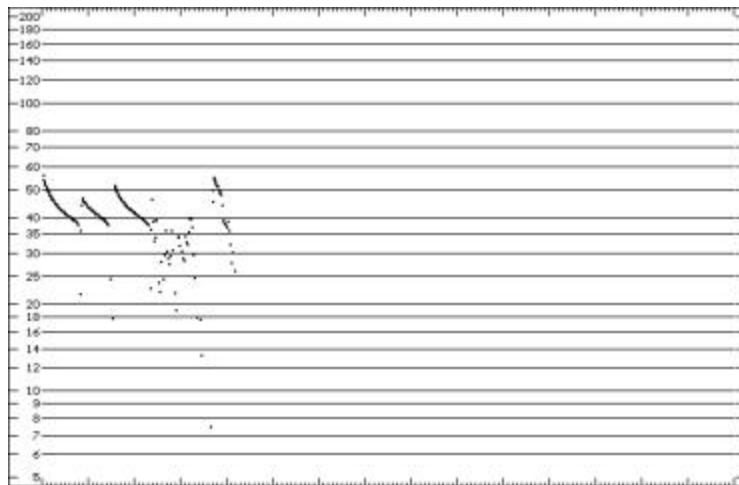
Time: u0 std Date: Loc: Spec:
 SP:
 Note:
 C7282128.24# Div 16 Type 132 2002/07/28 2128:24
 T01 150ms TR 10ms F7 COMP S1 2 FILT 1
 NWALOOK Version 4.8p 3 Mar 2001



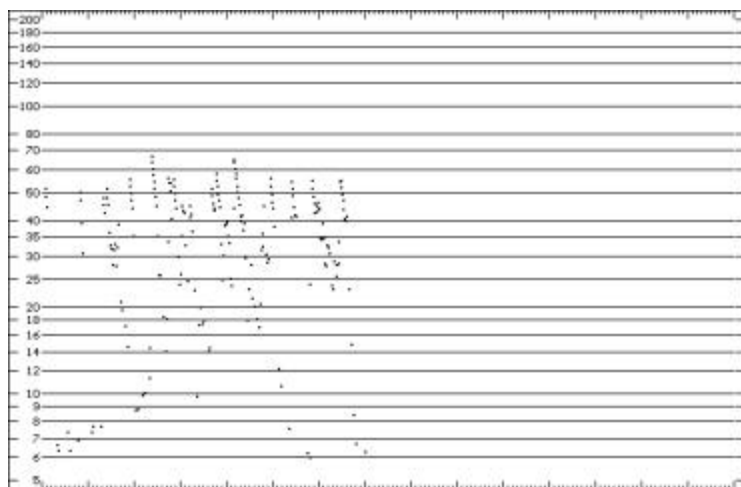




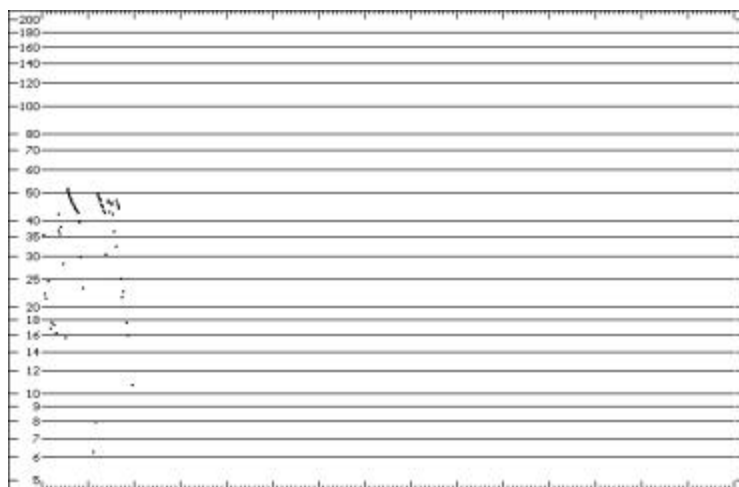
Type: u0 std Date: Loc: Spec:
 Note:
 C7282125.12# Div 16 Type 132 2002/07/28 2135:13
 101 150ms TR 10ms F7 comp S1 2 FILT 1
 NWALOOK Version 4.8p 3 Mar 2001



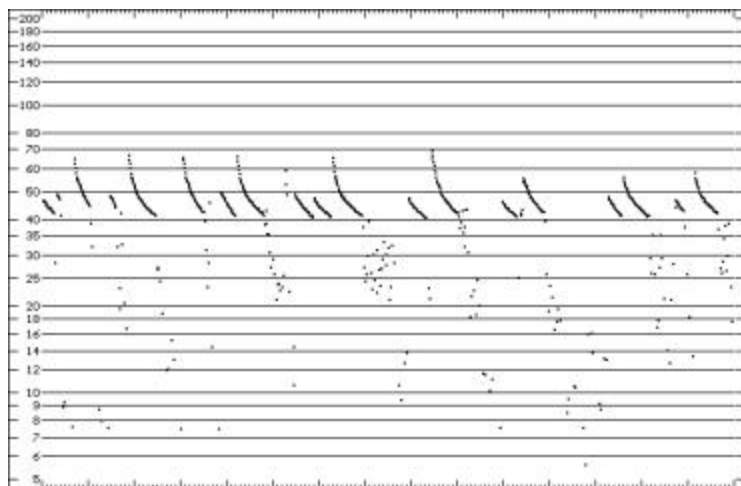
Type: u0 std Date: Loc: Spec:
 Note:
 C7282125.32# Div 16 Type 132 2002/07/28 2135:32
 101 150ms TR 10ms F7 comp S1 2 FILT 1
 NWALOOK Version 4.8p 3 Mar 2001



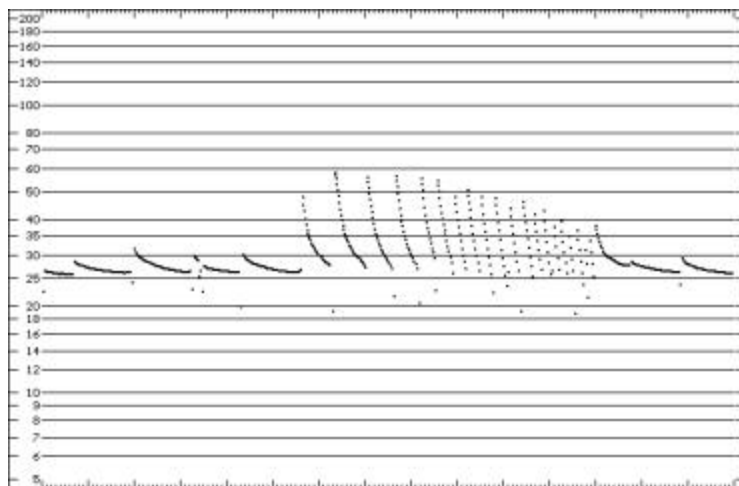
Type: u0 std Date: Loc: Spec:
 Note:
 C7282126.02# Div 16 Type 132 2002/07/28 2136:02
 101 150ms TR 10ms F7 comp S1 2 FILT 1
 NWALOOK Version 4.8p 3 Mar 2001



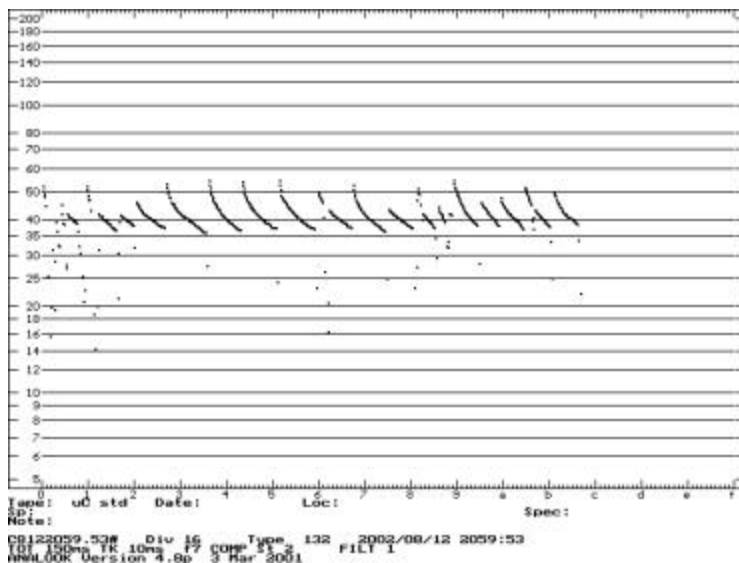
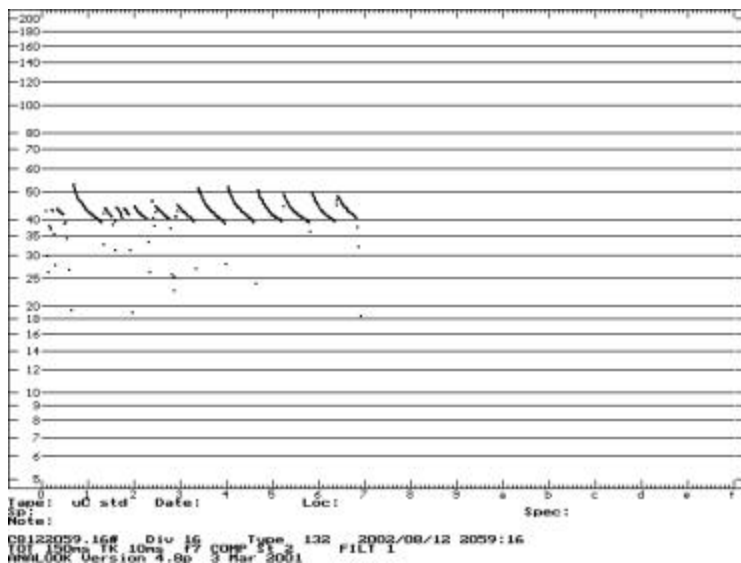
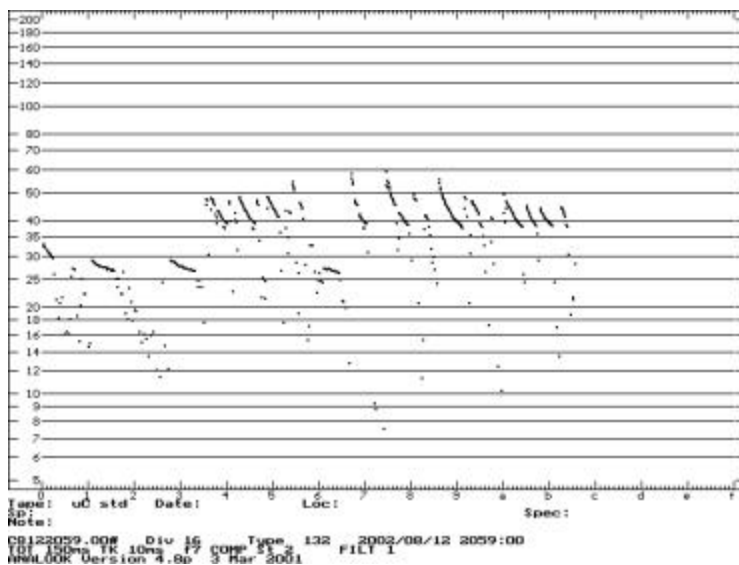
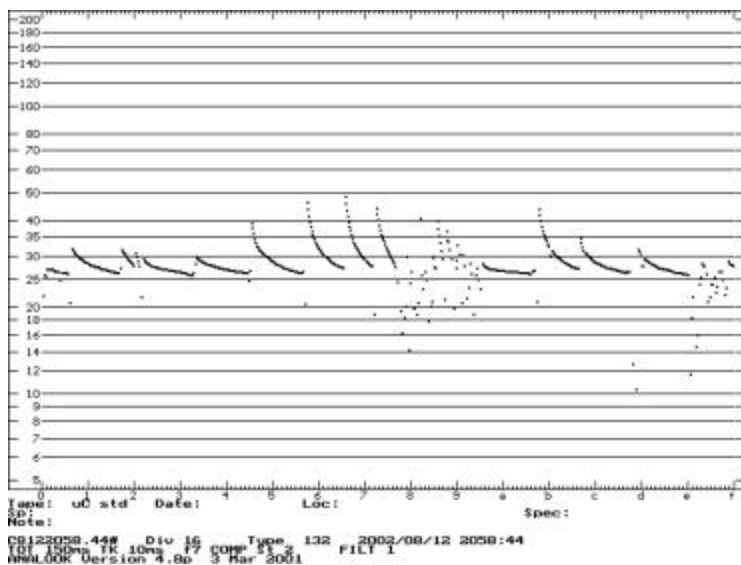
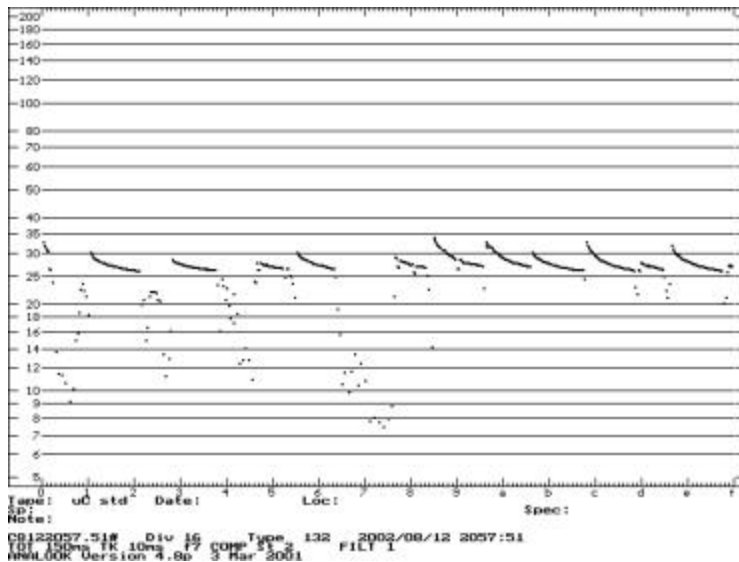
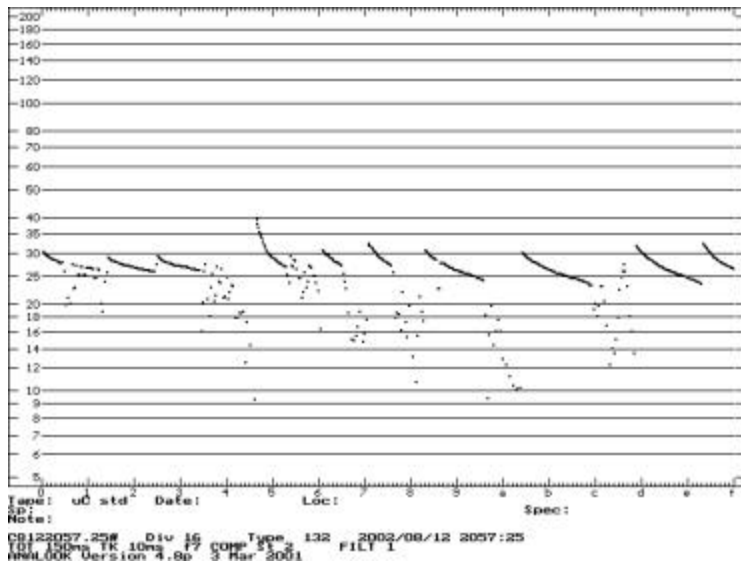
Type: u0 std Date: Loc: Spec:
 Note:
 C7282129.50# Div 16 Type 132 2002/07/28 2139:50
 101 150ms TR 10ms F7 comp S1 2 FILT 1
 NWALOOK Version 4.8p 3 Mar 2001

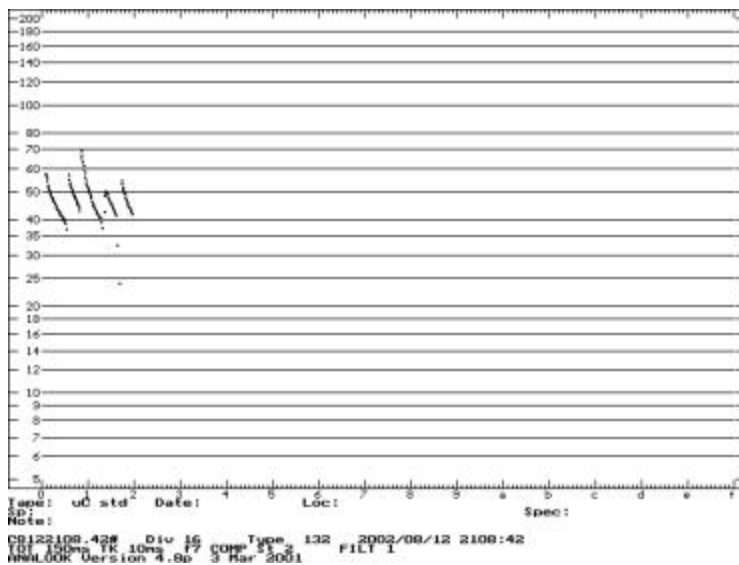
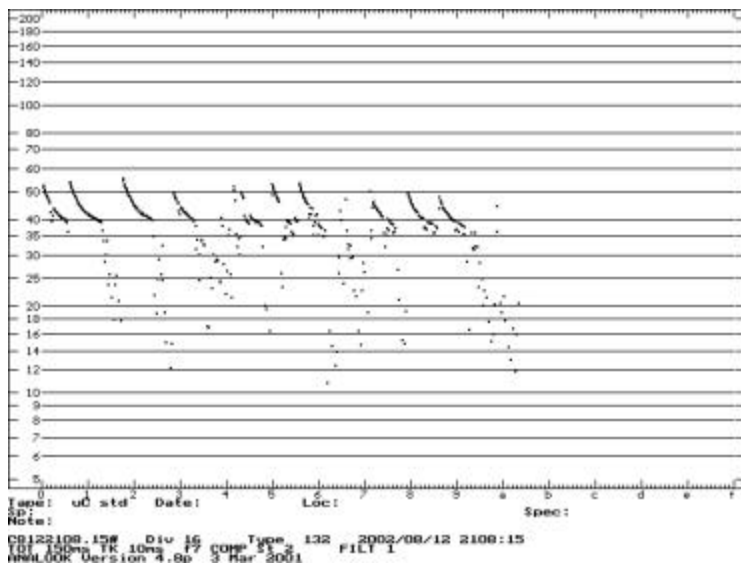
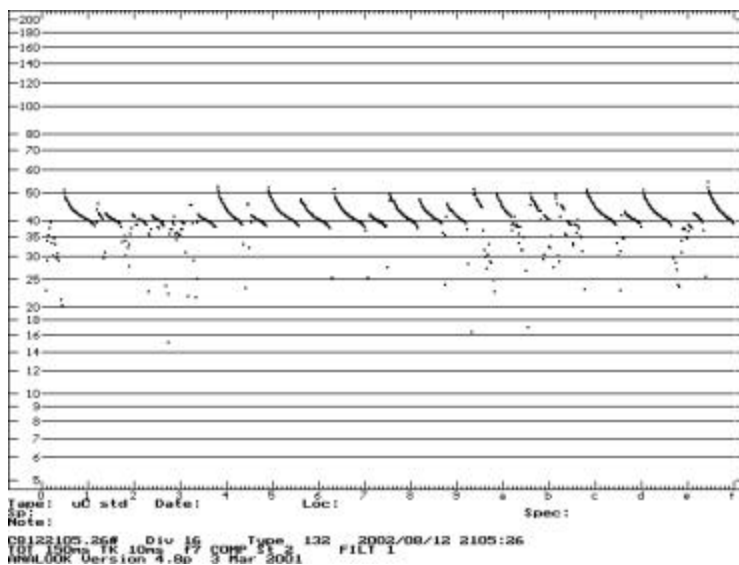
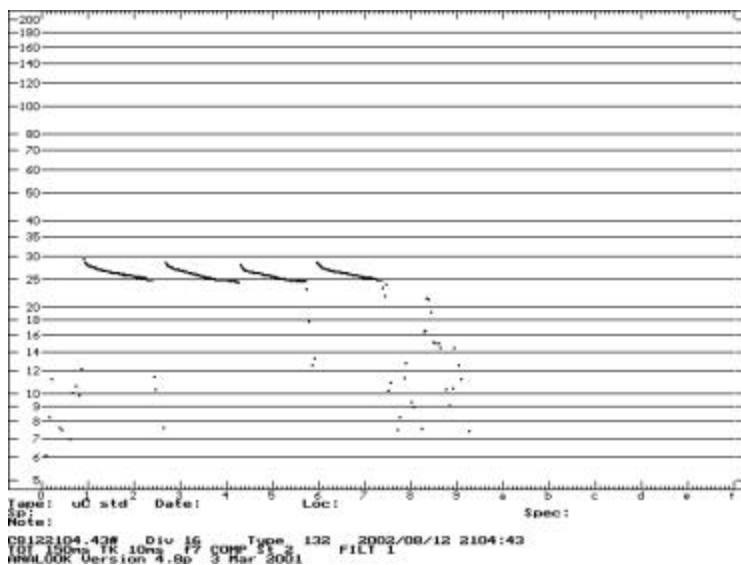
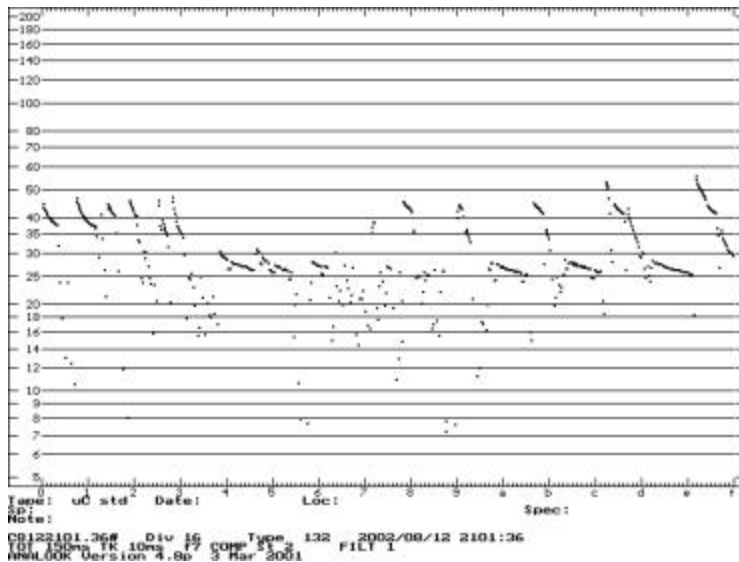
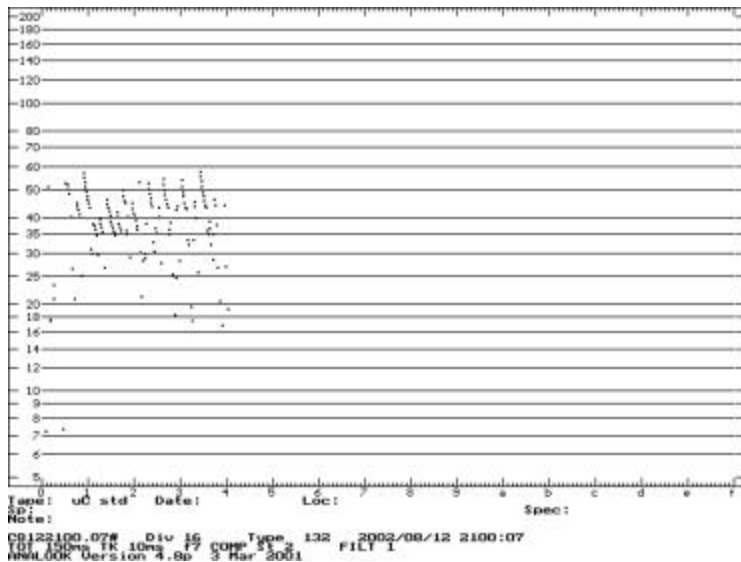


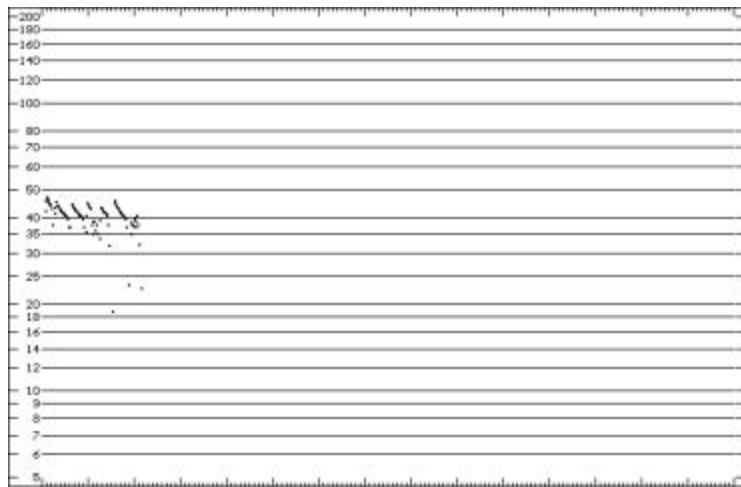
Type: u0 std Date: Loc: Spec:
 Note:
 C8122025.27# Div 16 Type 132 2002/08/12 2055:27
 101 150ms TR 10ms F7 comp S1 2 FILT 1
 NWALOOK Version 4.8p 3 Mar 2001



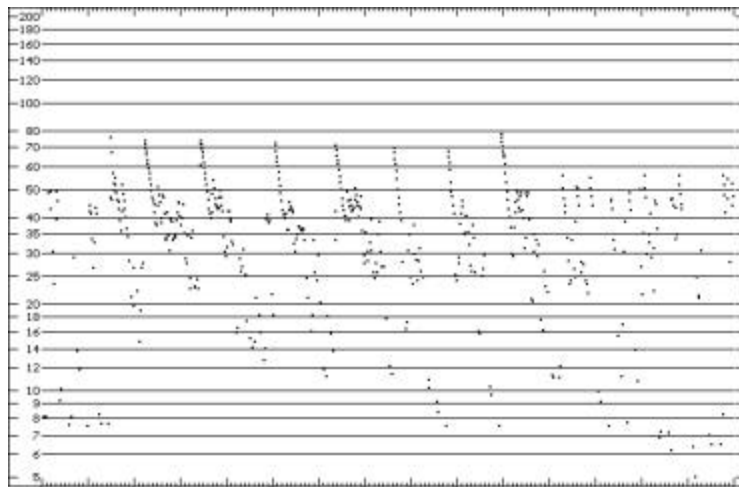
Type: u0 std Date: Loc: Spec:
 Note:
 C8122027.05# Div 16 Type 132 2002/08/12 2057:05
 101 150ms TR 10ms F7 comp S1 2 FILT 1
 NWALOOK Version 4.8p 3 Mar 2001



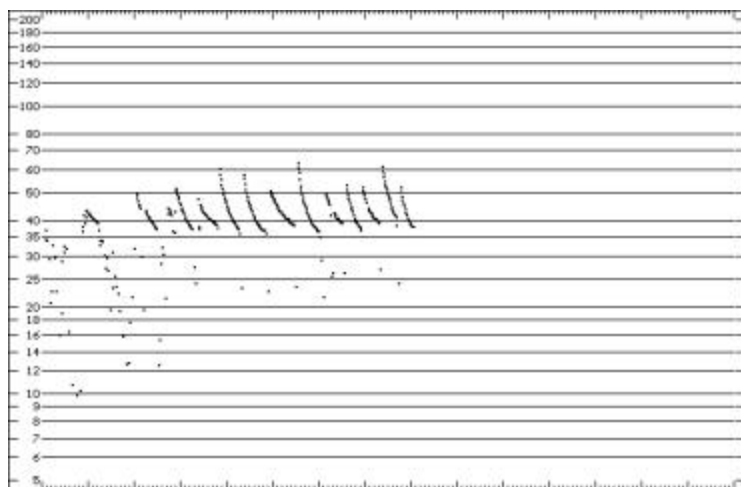




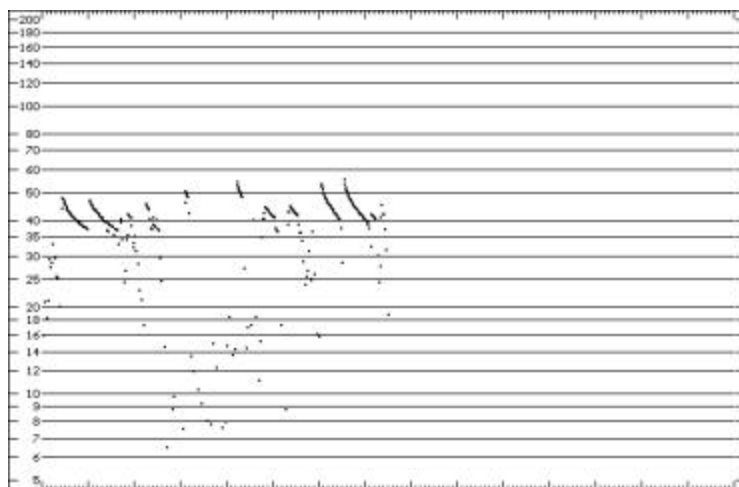
Note:
C0122109.06# Div 16 Type 132 2002/08/12 2109:06
T01 150ms TR 10ms F7 comp S1 2 FILT 1
HWILook Version 4.8p 3 Mar 2001



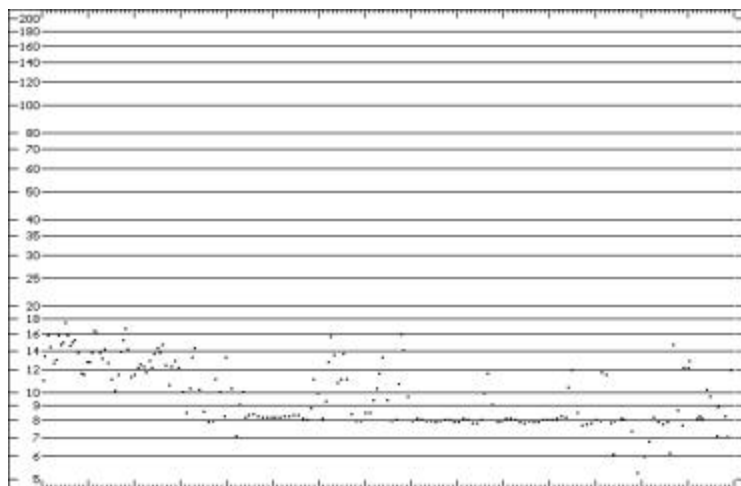
Note:
C0122109.47# Div 16 Type 132 2002/08/12 2109:47
T01 150ms TR 10ms F7 comp S1 2 FILT 1
HWILook Version 4.8p 3 Mar 2001



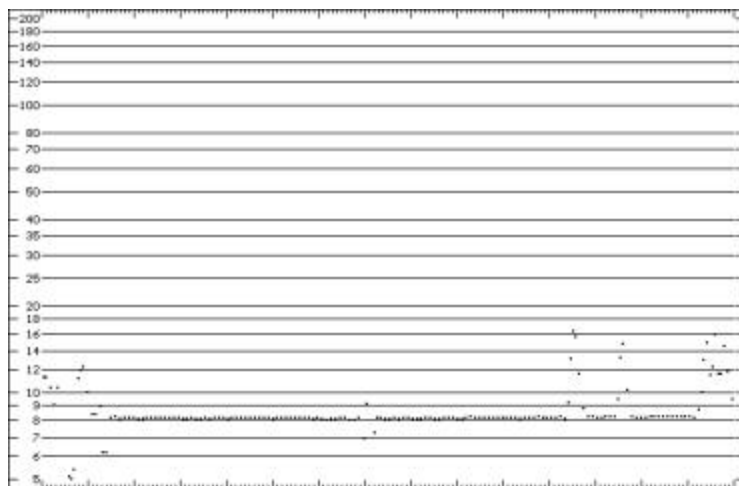
Note:
C0122113.54# Div 16 Type 132 2002/08/12 2113:54
T01 150ms TR 10ms F7 comp S1 2 FILT 1
HWILook Version 4.8p 3 Mar 2001



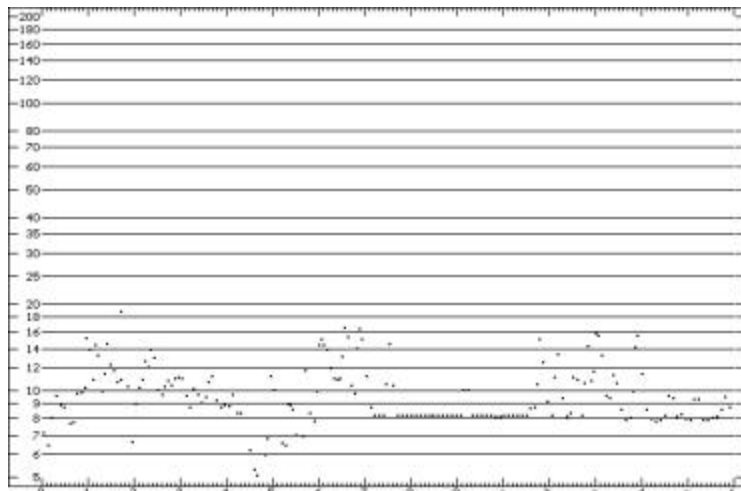
Note:
C0122114.21# Div 16 Type 132 2002/08/12 2114:21
T01 150ms TR 10ms F7 comp S1 2 FILT 1
HWILook Version 4.8p 3 Mar 2001



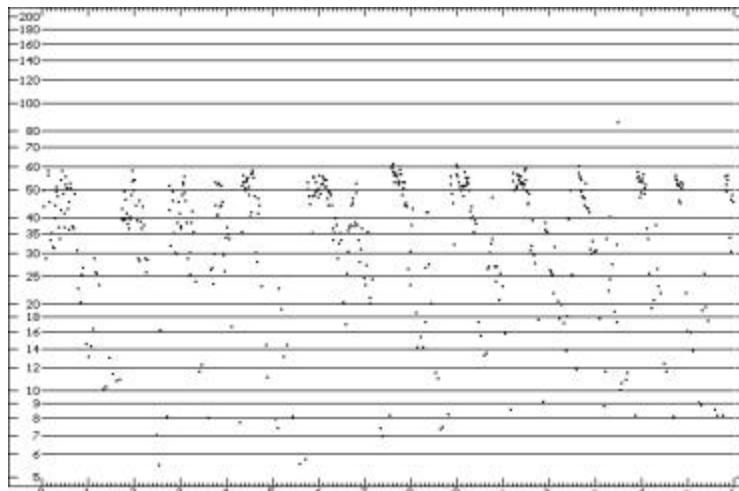
Note:
C0062006.14# Div 16 Type 132 2002/11/06 2006:14
T01 150ms TR 10ms F7 comp S1 2 FILT 1
HWILook Version 4.8p 3 Mar 2001



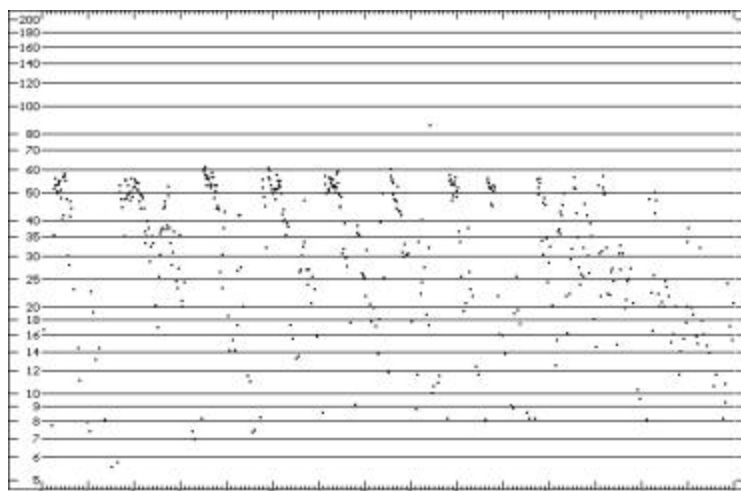
Note:
C0062015.00# Div 16 Type 132 2002/11/06 2015:00
T01 150ms TR 10ms F7 comp S1 2 FILT 1
HWILook Version 4.8p 3 Mar 2001



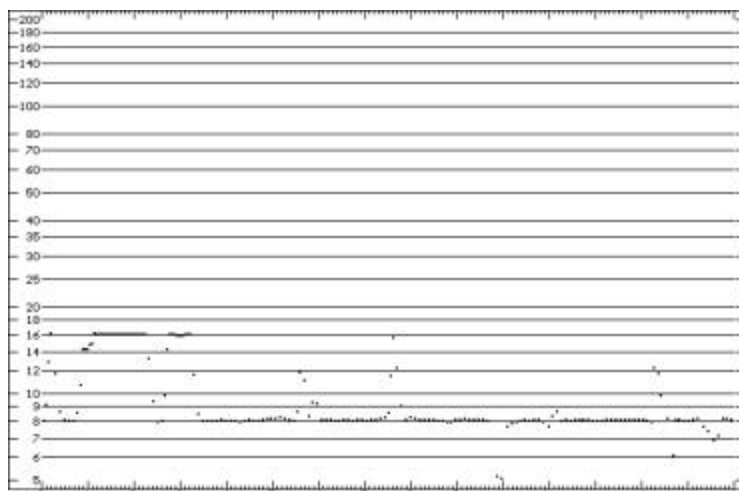
CR062047.39# Div 16 Type 132 2002/11/06 2047:38
 (DT 150ms TR 10ms F7 COMP S1 19 FILT 1
 HWILOOK Version 4.8p 3 Mar 2001



CR062123.42# Div 16 Type 132 2002/11/06 2123:42
 (DT 150ms TR 10ms F7 COMP S1 463 FILT 1
 HWILOOK Version 4.8p 3 Mar 2001



CR062123.42# Div 16 Type 132 2002/11/06 2123:42
 (DT 150ms TR 10ms F7 COMP S1 625 FILT 1
 HWILOOK Version 4.8p 3 Mar 2001



CR062128.52# Div 16 Type 132 2002/11/06 2128:52
 (DT 150ms TR 10ms F7 COMP S1 2 FILT 1
 HWILOOK Version 4.8p 3 Mar 2001